

Pacific Seabird Group



BULLETIN

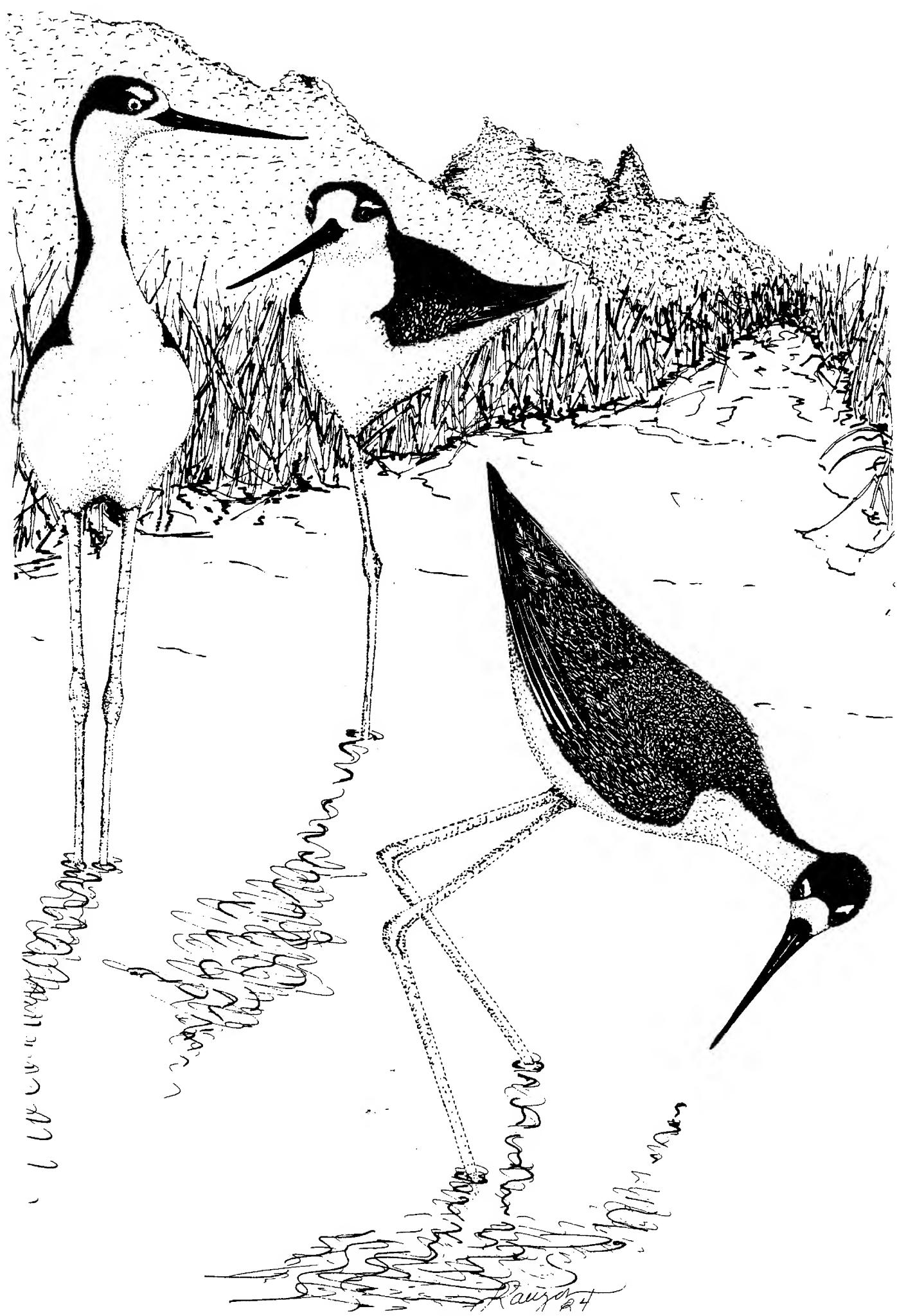
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1989

PACIFIC SEABIRD GROUP

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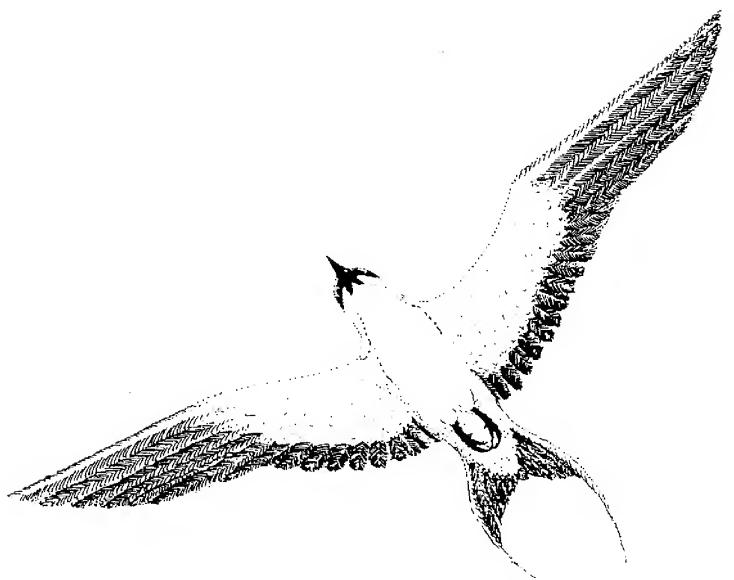
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EDITOR'S PAGE

The Pacific Seabird Group Bulletin has a nice collection of line drawings that we have used in the bulletin. During the last couple of years, Mark Rauzon has sent us very nice additional material. However, because of the limited supply, I have been forced to use some material again and again. I encourage PSG members to send me new material to brighten future issues of the bulletin.

Malcolm C. Coulter



THE CHAIR'S PAGE

Greetings to all, especially all of you PSG members that I missed at the Washington DC meeting, which is nearly all of you. We had an excellent meeting, although I really like to meet with PSG members at a PSG meeting.

Significant events have happened within PSG in the last year. Our 1988 annual meeting was a joint meeting in Washington DC with the Colonial Waterbird Society, a special meeting planned when the CWBS came to San Francisco in 1986 for our first joint meeting. The meeting had many important interactive executive committee and planning sessions in which the members of the two groups got to know one another better, and the meeting was a success for that reason alone. The scientific paper sessions were excellent, with more than 80 platform and poster papers presented. The abstracts from the meeting are, as usual, presented later in this issue. Unfortunately, because of the distance to Washington DC and the October timing of the meeting during the fall school term, the PSG attendance was low, with just a *core group* of about 20 PSG members attending. A great deal of work was accomplished, and interaction between PSG and CWBS initiated much thinking within both organizations about the need and desirability for PSG and CWBS to sponsor and publish a first rate ornithological journal. More about the journal later.

Much of the conservation work at this year's meeting dealt with issues surrounding Marbled Murrelets. The dearth of knowledge about this species, its population size, at-sea distribution, nesting territories, and the threats to nesting habitats posed by plans for logging of old growth timber have combined to make this a critical year for learning more about this unlikely forest seabird. 1989 should undoubtedly be declared "The Year of the Murrelet" for the letters and prodding to be given to agencies to enlighten them about the need for Marbled Murrelet research.

In addition to murrelet conservation issues, a unique bi-national conservation program is being undertaken in Southern California and Mexico to protect estuarine and beach lands on both sides of the border. The project, *Pro Esteros*, was described by Barbara Massey at the Washington meeting, and really deserves attention and publicity. The concept could be extended to all four corners of the US border, especially the Rio Grande Valley, Puget Sound and the San Juan Islands, the Great Lakes, and the Bering Sea. I encourage all interested parties to contact Barbara for ideas and advice on setting up such an international cooperative conservation movement.

I would like to do everything possible to encourage a record turnout at our next annual meeting in Victoria, British Columbia, February 21-24, 1990. The Victoria meeting promises to have an excellent program, including an important update symposium on "The Status, Ecology, and Conservation of Marine Birds of the Temperate North Pacific" Feb. 22 and 23. Kees Vermeer has really taken off and is under full steam, already planning the meeting and symposium. Vancouver Island is guaranteed to be beautiful, and the meeting will surely be a success. Plan to join us in Victoria.

The most exciting issue to come before the executive committees of both PSG and CWBS in Washington DC was the need for a first-rate international ornithological journal devoted to seabirds and colonial waterbirds. Papers on seabirds are now sprinkled throughout the literature, making it an almost

impossible task to keep up with current seabird research. The CWBS has made wonderful progress with its attractive journal *Colonial Waterbirds*, but the need for a truly international journal for all of our members (and researchers from the other 6 or 7 seabird groups) started our executive committees thinking out loud about the possibility of undertaking a joint publication which could grow with input from other seabird groups and an international editorial review board. Some internal correspondence has occurred between the groups, and later in this Bulletin is a letter from David Nettleship succinctly presenting the need for cooperation between PSG and CWBS. I would like to plead for comments from all members, as I will be exploring such matters as organization, costs of publication, and financial obligations which will be required of PSG if we decide to embark on such an important endeavor.

D. Michael Fry



PACIFIC SEABIRD GROUP NEWS

PROPOSED MINUTES OF THE EXECUTIVE COUNCIL MEETING, 13 OCTOBER 1988, WASHINGTON, D.C.

Scott Hatch called the meeting to order at 19:15. A quorum was present consisting of Scott Hatch, Dan Anderson, Roger Clapp, Malcolm Coulter, Michael Fry, Joel Hubbard, Lora Leschner, Clare Lloyd, Barbara Massey, Vivian Mendenhall, C.J. Ralph, Doug Siegel-Causey, and Kees Vermeer. Proxies were held for Ken Briggs, Tony DeGange, Ellen Chu, Judith Hand, Roy Lowe, and Mark Tasker.

1. Scott Hatch proposed a number of additions to the meeting's agenda which were approved by the Council.
2. Vivian Mendenhall read the minutes of the 1987 Executive Council meeting held in Asilomar, California. The minutes were approved unanimously by the Council.
3. Doug Siegel-Causey read the interim Treasurer's report for Ellen Chu. That report is present elsewhere in the Bulletin. Siegel-Causey warned that figures for total income, expenditures and balance for 1988 are provisional because no accounting has been received yet for the 1987 meeting in Asilomar or from the Marbled Murrelet workshop in September.

Siegel-Causey raised a number of problems related to the Treasurer's position for consideration by the Executive council. First, many important issues arise that should be considered by the entire Executive Council rather than just the Treasurer, e.g. should there be a family membership category, should PSG contribute to the Savannah River Ecology Laboratory to offset their expenses for assisting in publication of the Bulletin. Siegel-Causey suggested that an ad hoc finance committee be established to help the Treasurer make important financial decisions and for financial planning and budget preparation. Siegel-Causey also stated that the Treasurer has too much to do and suggested that another committee be formed to look into transferring some of the Treasurer's duties to the Secretary. A committee composed of the Chair, incoming Chair-elect, Treasurer and Secretary was appointed to look into the latter problem. A motion was made to accept the Treasurer's report. The motion was SECONDED and PASSED.

4. Malcolm Coulter summarized his accomplishments over the last year and reported that one issue of the Bulletin was published in the spring, and another is in press. Coulter has expanded the journal exchange program with other organizations including one in Spain. Currently the Savannah River Ecology Laboratory is arranging for the printing of the Bulletin. Estimated cost of publication is about \$1,100 per issue plus \$200 for postage. Coulter said that he pays the SREL for their expenditures periodically but that the arrangement is informal. He suggested that if PSG were bigger, the IRS would require stricter accounting of the costs of publication. Coulter believes that publication costs of the Bulletin are fair. A motion was made to accept the Editor's report. The motion was SECONDED and PASSED.

5. Reports of Standing Committees

Conservation Committee and Seabird-fisheries Interaction Committee: Art Sowls read the report of the joint meeting of the two committees. Sowls mentioned that comments on the Comprehensive Conservation Plan for the Alaska Maritime National Wildlife Refuge are due on 26 October. The plan will become final sometime after that date with the exception of potential Congressional action on wilderness issues. Art also mentioned that funding has been found for the Alaska seabird disturbance brochure and that it will be drawn professionally and published in 1989. During the joint committee meeting, Al Manville, a lobbyist for Defenders of Wildlife, reviewed recent legislation to control plastic pollution at sea as well as other proposed legislation on the subject. Also, Stan Senner reviewed ICBP efforts to promote more work on non-game birds (including seabirds) by the government, particularly the U.S. Fish and Wildlife Service. He urged all interested PSG members to provide comments to the Fish and Wildlife Service on their non-game management and research programs. Kilauea Point on the island of Kauai has been added to the Hawaiian Islands National Wildlife Refuge. The issue of entanglement of seabirds and whales in gill-nets in the Sea of Cortez was also raised. It was decided that more information from Enriqueta Velarde will be needed before PSG responds on the issue. Other issues that were discussed at the meeting included mortality of Brown Pelicans along the west coast from bacterial infections and the recent inhabitation of remote islands, often seabird colonies, which allows the colonizing country to claim offshore waters as part of their territory. The last issue was discussed in a letter by Robert Pitman in the last issue of the PSG Bulletin (Volume 15, Number 2) and has been passed on to the International Council for Bird Preservation.

Fund-raising Committee: The report of the Fund-raising Committee was read jointly by Lora Leschner and George Divoky for Judith Hand. Lora and George reported that the Endowment Fund now stands at \$16,000. Life Memberships and sale of T-shirts have been the principal sources of the fund. PSG needs to raise \$50,000 before any money can be obligated for funding symposia, providing honoraria for speakers and paying for travel of students and invited speakers to meetings. More funds need to be raised soon to reach this goal and to prevent inflation from eroding the endowment's value. The Committee's plans for the upcoming year include production and sale of a new T-shirt, and development of a slide show for presentation to yacht clubs which might donate money. The slide talk will feature 1st-class slides and a text developed by Lora, George and Dan Anderson. The text will include information on local seabirds and conservation issues. The report of the Fund-raising Committee was accepted by the Council.

6. Malcolm Coulter read the report from the ICBP. The ICBP passed a statement supporting "Threatened" status for the Marbled Murrelet. This statement appeared in the last bulletin (Volume 15, Number 2). Malcolm's comments regarding the ICBP's position on nongame work of the Fish and Wildlife Service paralleled Stan Senner's.

7. Lora Leschner reported for the Marbled Murrelet Technical Group and reviewed the workshop of 27-28 September. The workshop was very well attended by researchers from all states with Marbled Murrelets, by representatives from all National Forests with Marbled Murrelets, and all appropriate state Fish and Game agencies except Alaska. A considerable amount of research completed in 1988 was reviewed. Research objectives for 1989 have been drafted and include refinement of census methods, completing intensive inventories of forest stands to identify those with murrelets, and locating more nests. Besides new research thrusts, courses of action that resulted from the workshop included drafting a new letter to forest agencies emphasizing concerns over logging of old growth and proposing a moratorium on such logging, drafting a letter to the Fish and Wildlife Service proposing protected status for the Marbled Murrelet, and increasing public education, specifically production of a poster about the Marbled Murrelet. It was MOVED that the \$300 earned from the workshop go towards production of a poster. the motion was SECONDED and PASSED.
8. The 1989 annual meeting of the Pacific Seabird Group will be hosted by the Royal Museum of British Columbia in Victoria, B.C. in February, 1990. Kees Vermeer is organizing a symposium for the meeting entitled *Ecology and Conservation of Marine Birds of the Temperate North Pacific*. The symposium proceedings will be published by the museum and the Canadian Wildlife Service. Co-editors and most authors have been selected. Ken Briggs, Kees Vermeer and Stewart Fefer will lead the symposium sections. Doug Siegel-Causey will serve as Program Chair and Kees Vermeer as interim Chair of the Local Committee. Dave Nettleship reported that raising funds to publish the symposium may be more difficult than in 1983. It usually takes about \$20,000 to produce 750 copies of several hundred pages.

9. New Business

A motion was made to establish an ad hoc committee of a few members that will develop budgeting procedures and that will have oversight over the Treasurer, to be headed by the Chair-elect. The motion carried and Malcolm Coulter, C.J. Ralph were appointed to establish a second ad hoc committee to reorganize the duties of the Secretary and Treasurer with members to be appointed by the Chair. The committee will be composed of the Chair, Doug Siegel-Causey, the Secretary, and Treasurer.

Regarding a response to the Fish and Wildlife Service's non-game program, a motion was made that the Chair appoint someone to review the document and draft comments before 1 December, 1988. The motion was SECONDED AND PASSED. Scott appointed Malcolm Coulter and he agreed to solicit comments from other members, assemble them and pass them along to incoming Chair Fry.

A draft of a letter asking that the Oregon Department of Fisheries and Wildlife reconsider allowing fishermen to harass cormorants that are supposedly eating trout smolts was read. A discussion ensued during which Doug Siegel-Causey pointed out that there are at least a dozen studies that show cormorants have no impact on trout populations.

After a brief discussion of wording, the letter was approved by the Council.

Drafts of two additional letters were read, discussed and approved by the Executive Council. The first concerned itself with the disturbance of seabird colonies off the Oregon coast by boats participating in a new sea urchin fishery. In the letter PSG urged the Oregon Department of Fisheries and Wildlife to close the fishery seasonally to avoid disturbing breeding seabirds. The second letter to the California Department of Fish and Game urged the department to fund inventories of wildlife impacted by oil spills. To date such inventories have been done voluntarily by various organizations resulting in variable and inconsistent treatment from spill to spill. It was felt that it would be better to have formally funded, organized studies that would provide data of more use to those interested in seabirds.

George Divoky read the Historian's report and stated that photos from the 1987 meeting are now in PSG's archives. George suggested that PSG buy a gavel and plaque that would have engraved names of past Chairs and that it be passed down each year to the new chair. A motion was made to buy a gavel and plaque which was SECONDED and PASSED.

A discussion ensued concerning who should be responsible for back issues of the Bulletin formerly kept by Ralph Schreiber. It was suggested that the Western Foundation of Vertebrate Zoology would be an appropriate repository and it will be looked into by the Chair.

It was suggested that PSG join the Entanglement Network, a consortium of groups that oppose plastic pollution in the ocean. The Executive Council agreed to look into the network but will not join if it turns out to be primarily a lobbying organization.

Barbara Massey moved that PSG provide formal support in the form of a resolution to *Pro Esteros*, a new joint U.S.-Mexican conservation organization formed to save estuaries in Baja California from development. The motion was SECONDED and PASSED.

Through a motion, the Executive Council decided that the location for the 1990 meeting will be Asilomar, provided Dan Anderson finds that it is available. Other suggested venues were New Zealand (to coincide with the 1990 IOC meeting), Hawaii, Ensenada (Mexico), and Davis (California). It was decided that PSG should meet *close to home* after two more distant meetings. Anderson thought it too late to get Davis for 1990 and that a meeting there would be expensive.

Concerning joint meetings with the Colonial Waterbird Society, Don McCrimmon of CWBS stated that they are interested in participating, perhaps at a four-year interval. A motion was made that PSG investigate the proposal of future joint meetings with the Colonial Waterbird Society at four-year intervals. During discussion of the motion, it was pointed out that each organization historically meets at different times of the year. It was suggested that the host of the meeting decide on the dates. The motion was carried.

Scott Hatch announced the results of the election for 1989 Executive Council members. They are as follows:

Chair - Michael Fry
Chair-elect - Doug Siegel-Causey
Treasurer - Ellen Chu
Secretary - Tony DeGange
Regional Representatives
 Alaska - Joel Hubbard
 British Columbia and Washington - Kees Vermeer
 Oregon and northern California - Roy Lowe
 Pacific - Dan Moriarty
 Latin America - Juan Guzman Poo

Palmer Sekora resigned as chair of the Elections Committee.

There was a lengthy discussion about the prospects of a new journal to be published as a collaborative effort between the Pacific Seabird Group and the Colonial Waterbird Society. Ralph Morris, editor-elect of *Colonial Waterbirds*, and several others spoke out in favor of a jointly supported journal. Morris stated that two issues are produced each year but that CWBS could probably support three issues. Eventually they hope to publish quarterly. Although *Colonial Waterbirds* was dedicated primarily to wading birds, they have been receiving more and more manuscripts on seabirds. A motion was carried to appoint a committee headed by the incoming chair to the Executive Council at the 1989 meeting in Victoria. Committee members include Michael Fry, Doug Siegel-Causey, Malcolm Coulter, C.J. Ralph, and David Nettleship. The Colonial Waterbird Society has a similar committee looking into the journal issue.

A motion was carried to ask the Navy to stop using Sea Lion Rocks off Washington for bombing practice. The Navy is doing this despite the results of a study they commissioned which showed negative impacts to wildlife. A resolution on the same topic was passed by the Executive Council.

Doug Siegel-Causey announced that he has received an invitation from public and private organizations in the USSR that wish to organize a joint symposium on problems affecting birds of the North Pacific, to be held in the USSR probably in 1990 or 1991. Siegel-Causey requested formal approval from the Executive Council for him to try to obtain funding for such a meeting. A motion was made to that effect and it was SECONDED and PASSED.

A motion was made that the Executive Council approve the same budget for 1988 as 1987 with the exception that receipts from the Marbled Murrelet workshop go towards production of a poster. The motion carried.

10. Other business

It was pointed out that Point Reyes Bird Observatory, the permanent home of PSG, has been forwarding mail to the Chair only occasionally. C.J. Ralph said that he would look into this.

The status of the Marbled Murrelet symposium in 1987 was discussed. It was supposed to go to the printer by the end of 1988. C.J. Ralph pointed out that the symposium is rapidly becoming out of date. Michael Fry said he would look into this.

It was moved that the Colonial Waterbird Society be thanked for hosting the 1988 meeting. The motion was SECONDED and PASSED.

Scott Hatch adjourned the meeting at 22:50.

Respectively submitted
Anthony R. DeGange, Secretary

RESOLUTIONS

Resolution by the Pacific Seabird Group on support of *Pro Esteros*

BE IT RESOLVED THAT *Pro Esteros* a new bi-national conservation organization formed to protect and preserve the estuarine wetlands of Baja California, Mexico, receive the approval and support of the Pacific Seabird Group. Support will consist of technical assistance, dissemination and exchange of information via the *PSG Bulletin* and other forms of contact with members, and through joint involvement in projects of mutual interest. Adopted this day of October 14, 1988.

Resolution in appreciation of *The Colonial Waterbird Society's* hosting the 1988 joint meeting

WHEREAS the Pacific Seabird Group is an organization dedicated to the study and conservation of seabirds, and

WHEREAS an exchange of information with other professionals is goal of the Pacific Seabird Group, and

WHEREAS an ornithological conference is an opportunity for such an exchange,

THEREFORE BE IT RESOLVED THAT the Pacific Seabird Group expresses its appreciation to the Colonial Waterbird Society for hosting this joint meeting, October 12-15, 1988.

TREASURER'S REPORT, 1988

After five years as PSG Treasurer, Douglas Siegel-Causey turned the office over to Ellen Chu, and routine PSG banking migrated west to Kirkland, Washington. Our savings and endowment accounts are still held through Dean-Witter Reynolds and a New Jersey Bank.

CARRYOVER FROM 1987

Main checking account	\$614.90
<i>Bulletin</i> checking account	158.69
Savings	1,341.54
Endowment	13,825.54
 INCOME	
	\$37,688.96
Dues	5,825.00
Fund raising	1,766.11
Annual meeting	
La Paz 86 meeting (net)	864.25
Asilomar (gross)	25,757.04
Marbled Murrelet workshop	1,757.00
Interest on savings	87.71
Interest on endowment	1,530.29
Miscellaneous income	101.56
 EXPENSES	
	\$29,201.92
Bulletin and related costs	2,876.07
Annual meeting, Asilomar	23,580.46
Marbled Murrelet workshop	1,605.55
Fund raising	245.17
Officers (supplies, postage, etc.)	620.67
ICBP dues	200.00
Bank account expenses	74.00
 INCOME OVER EXPENSES	
	\$8,487.04
 ACCOUNT BALANCES	
Main checking account	576.39
<i>Bulletin</i> account (as of 12/31/88)	1,542.47
European dues account	approximately 193.00
Savings (as of 12/31/88)	3,329.25
Endowment (as of 12/31/88)	17,813.22

Income

The accounts for both the 1986 annual meeting in La Paz and the 1987 meeting at Asilomar were settled this year, together bringing PSG a total of \$3,040.83 net income. The Marbled Murrelet workshop in Portland, Oregon, netted \$151.45. PSG earned no income from the Washington, D.C., meeting with the Colonial Waterbird Society. Fund-raising income came mainly from T-shirt sales at the Asilomar meeting. As usual, the bulk of our income came from membership dues, which were increased as of 1988.

Expenses

PSG incurred no expenses from the Washington, D.C., meeting. Officers' expenses doubled in 1988 compared with 1987, primarily because of supplies purchased by new officers. The figure for *Bulletin* costs reflects direct payments to the editor and typesetter, mailing; and a payment to the Savannah River Ecology Laboratory for printing. PSG still owed SREL about \$2,700. The *Bulletin* costs between \$2,000.00 and \$3,000.00 per annual volume produced.

Endowment Fund

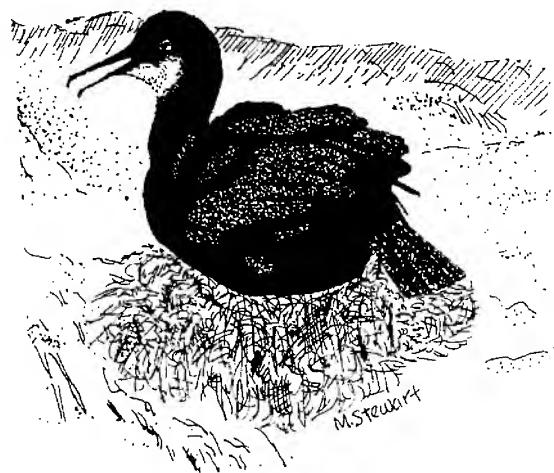
The endowment fund is in the form of U.S. Government Securities, brokered through Dean-Witter Reynolds. At the end of 1988, PSG owned 1,891 shares at a market value of \$9.42 per share (compared with 1,418 shares at \$9.75 per share in December 1987). All life membership dues and fund-raising income are deposited directly into this account; for 1988, this income totaled \$2,161.50 (compared with \$2,4300.00 for 1987).

Membership

The master membership list is now being kept as a FileMaker 4 database on the treasurer's Macintosh SE computer. At the end of 1988, PSG had 425 members (compared with 391 in 1987), of whom 133 were in arrears a year or more on their dues. Letters have been sent to every member still on the rolls - paid or unpaid - encouraging people to get their dues up to date while we get our mailing list up to date. In addition, 50 institutions worldwide subscribe to the PSG Bulletin.

1989 ANNUAL MEETING

The 1989 annual meeting of the Pacific Seabird Group will be hosted by the Royal Museum of British Columbia in Victoria, B.C. from 21 to 24 February, 1990. Kees Vermeer is organizing a symposium for the meeting entitled *Ecology and Conservation of Marine Birds of the Temperate North Pacific*.



CONSERVATION COMMITTEE

Two guest speakers highlighted the annual meeting. Dr. Albert Manville, Chairman of the Entanglement Network (a coalition of Environmental groups lobbying Congress on ocean pollution) gave us an overview of recently passed and current legislation on ocean pollution and recycling. Dr. Stan Senner of International Council for Bird Preservation - U.S. Section, gave an overview of a recently completed draft Nongame Management Plan by the U.S. Fish and Wildlife Service. The Service is seeking comments on this draft. About fifty people attended including several interested members from the Colonial Waterbird Society.

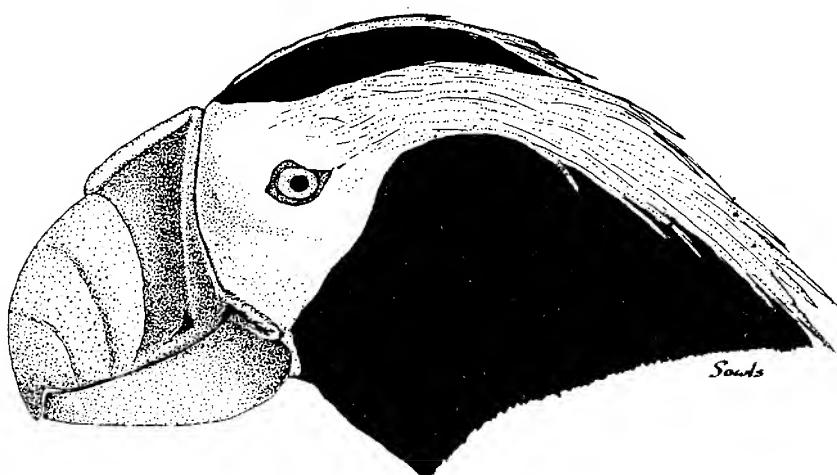
Following our guest speakers the conservation committee met jointly with the Marbled Murrelet Technical committee and the Seabird-Fisheries Interactions Committee to save time and to discuss issues of joint concern. Main topics discussed included:

- 1) Seabird Disturbance Brochures - A second draft of the Alaska version was presented. The brochure will be finished this winter and printed through the U.S. Fish and Wildlife Service, Alaska Natural History Association, and the Prince William Sound Recreation Association. Many thanks are extended to those PSG'ers who helped design and review this brochure.
- 2) Alaska Maritime National Wildlife Refuge Comprehensive Management Plan - PSG's recent comments to the draft version were discussed. Of future importance is the wilderness designation part of the plan which Congress must pass. We feel the Fish and Wildlife Service's recommendations are incomplete. They did not consider many very important refuge lands (Semedi, Barren, Shumagin Islands, etc.) because they have Native land claims filed on them. Many of these claims will be found invalid, since they have filed for many more acres than they are entitled. Therefore, we feel they should be considered for wilderness designation to cover any lands not transferred to the Natives.
- 3) Tongass National forest Logging Plan - It was decided that PSG should review this plan because the Tongass Forest is perhaps the world's stronghold for Marbled Murrelets, a species that has been reduced in numbers along much of its range. Vivian Mendenhall will review the plan.
- 4) Marbled Murrelet - Lora Leschner gave a review of the Marbled Murrelet Technical Committee meeting in Portland. We all agreed that the committee had done an excellent job. We agreed that letters about Murrelet concerns should be sent to West Coast Federal, State, and Provincial agencies.
- 5) Gill Net Mortality in Puget Sound - To date, little has been received from a widely circulated PSG letter sent regarding the need for more information of mortality of seabirds from fishing nets in Puget Sound.
- 6) Cormorant Harassment - the Oregon Department of Fish and Wildlife has given a permit for the harassment of cormorants for Tillamook and Nehalem Bays. the intention was to prevent cormorants (primarily Brandt's Cormorants) from preying on steelhead and salmon smolt. PSG

will send a letter to the Department stating that numerous studies have found cormorant predation to have no significant effect on fish stocks and that harassment will disturb cormorants and other species.

- 7) Urchin Harvest - a newly developing commercial urchin harvest off the Oregon coast is causing disturbance to seabird and marine mammals. Fish boats are coming very close to islands off the Oregon Islands National Wildlife Refuge which contains colonies and sea lion rookeries. PSG is sending a letter expressing concern and some management options such as seasonal closure of the fishery during critical times for seabird breeding and marine mammals.
- 8) California Oil Spills - California has had two recent oil spills. PSG feels that there was a lack of damage assessment and coordination of efforts by Federal and State agencies. PSG will send letters expressing our concerns.
- 9) Kilauea Point National Wildlife Refuge, Hawaii - Additions have been made to this refuge through Federal purchase of 37 acres and about 86 more acres donated in a deal with a land developer where he gets permits to sub-divide other lands. The Trust for Public Land arranged the deal. The project turned out to be a great success, largely through the work of Dan Moriarity.

Art Sowls



SHOULD PSG BEGIN TO PUBLISH A SEABIRD JOURNAL?

During the 1988 Washington DC meeting, outgoing PSG Chairman Scott Hatch addressed the Executive Committee of the Colonial Waterbird Society with the idea that both CWBS and PSG should investigate the desirability of jointly publishing a journal devoted to research papers of marine and colonial waterbird ornithology. CWBS is already publishing *Colonial Waterbirds* in an excellent format, and Scott's idea was the first hint of possible cooperation between the two societies.

The discussion at the Washington meeting immediately turned to the reality that CWBS already is publishing a journal, *Colonial Waterbirds*, and how would an independent journal published by the PSG interact or compete with *Colonial Waterbirds*? Members in both organizations then envisioned the possibility of jointly publishing a journal, building from the existing *Colonial Waterbirds* framework, and perhaps editorial and printing staff. Quickly it was realized by everyone that a joint journal also presented several potential problems: 1) Name of journal. A "neutral" name not identified with either organization would be desirable. Several names were suggested, including *Aquatic Ornithology*, *Marine and Freshwater Ornithology* (how does it exclude ducks?), and *International Journal of Marine Ornithology*. No one was completely satisfied with any of the above, and other names should be considered; 2) The financial obligations of the two organizations would be considerable. CWBS is doing an excellent job at present in publishing their journal at a cost to subscribers of about \$20 per year for two issues. PSG would have to closely examine its financial situation to be able to consider such an obligation; 3) If our two groups (and, eventually, other seabird groups) jointly participated in the journal, how would an independent editorial board be established, with both organizations giving up authority to that board. 4) How would both organizations restructure their dues payments so that persons belonging to both groups would have to pay for and receive only one Journal, but still receive both the CWBS Newsletter and PSG Bulletin?

General sentiment among the PSG members at the Washington DC meeting was agreement. The logic was: "PSG is now nearly 20 years old, and to be a lasting and successful organization, PSG should publish a first-rate marine ornithology journal". The most emphatic advice I have received since the meeting has been to the effect that there are far too many mediocre speciality journals and newsletters available today, and PSG should not begin publishing anything but the best available manuscripts. If PSG were to initiate a journal on our own, however, it would inevitably cause great competition between PSG and CWBS, who are already publishing *Colonial Waterbirds*. But, if a format for cooperation could be found, I believe the advantages to both societies would be great.

The advantages for PSG to participate or publish a marine ornithology journal would include: 1) recognition of the PSG as a bona-fide scientific organization; 2) Probable consolidation of the seabird literature into a single main journal; 3) Increasing PSG's membership and providing a significant product for its members.

The significant, difficult, elements of publishing a journal include: 1) the organization and running of an editorial board; 2) finding a good editor; 3) financial obligations (including the necessity of maintaining a

large, consistent dues-paying membership at a reasonable price); and 4) the initial difficulty in obtaining quality manuscripts, etc.

I personally would like to see PSG participate in publishing a primary avian journal. The enclosed editorial letter by David Nettleship indicates the same desire. I would like comments and journal name suggestions from everyone, so that we might seriously develop a proposal to put to both organizations by this summer. If we could include the proceedings of our 1990 Seabird Symposium as part of the first joint issue, it would be fantastic.

D. Michael Fry

7 December, 1988

Dr. D. M. Fry
Chair, PSG
Department of Avian Sciences
University of California
Davis, California 95616

Dr. D. A. McCrimmon
President, CWBS
Mount Desert Island Biological Laboratory
Salsbury Cove, Maine 04672

Dear Donald and Mike,

My apologies for taking so long in responding to the discussions at the joint meeting in Washington. I was away from my office and have just returned. I hope that the delay has not inconvenienced you too greatly.

On the basis of the substance of the letter from PSG to CWBS, I wonder how much room there really is to negotiate a consensus for a single journal. If the issue of a change in journal name is the main barrier preventing us (CWBS and PSG) from *coming together*, then I question whether there exists a genuine desire by either party to come to a mutually satisfactory publication arrangement. That being the case, then maybe we shouldn't waste each others' time in attempting to put together something that is clearly unattainable. But on the other hand, if CWBS and PSG truly wish to produce an end product that stands out as a **primary** avian journal, then let's sit down and resolve whatever problems there seem to be. If we fail to reach an agreement, I believe we will have failed the membership of each group by missing an unparalleled opportunity to create a world-class publication whose value as a whole far exceeds that of its individual member organizations. The alternative is to produce separate journals with considerable overlap in subject material which inevitably will relegate both (should they manage to survive) to something far less than the ideal. The waterbird community is looking for an international journal that can serve as the primary outlet for its research findings (applied & theoretical) and be a comprehensive information source for that branch of avian science -- now's the time to provide that instrument.

Please give the above some careful consideration. I will contact you shortly. Following this I shall submit my recommendation as to whether we should proceed or not with further discussion.

Sincerely,

David Nettleship

THE PROGRAM CHAIR'S COMMENTS
FIFTEENTH ANNUAL MEETING
National 4-H Center
Chevy Chase, Maryland
October 12-16, 1988
D. Michael Fry

The 1988 PSG Annual meeting was a joint meeting hosted by the Colonial Waterbird Society in Washington DC. The meeting was organized by the Local Committee chaired by Michael Erwin with Jeff Spendlow, Roger Clapp, Sean Furniss, Karen Ensor, Dan Brinker, Joan McKearnan, and Velora Anders. The meeting was held at the National 4-H Center in suburban Washington, just as the leaves were turning color and the weather turning crisp. The CWBS Program Co-Chair was Herb Kale, who, as the Host Organization representative, took primary responsibility and organized the entire program. The program was excellent, with 80 papers presented in nine platform and two poster sessions, plus a workshop convened by Malcolm Coulter on *Wading Bird Reproduction in 1988*.

Herb Kale deftly organized the papers papers at the 1988 meeting into sessions on Population Dynamics and Distribution, Behavior, Foraging Ecology, Population Ecology, Pollution Ecology, and Management. Interesting papers included accounts of the foraging behavior of Tierra del Fuego Indians who ate shags (D. Siegel-Causey), forest ecology and distribution of nesting Marbled Murrelats (C.J. Ralph), several species distribution and status reports, the Chaos of Christmas Bird Count data (D. McCrimmon), and several studies of contaminants and their effects on specific populations of waterbirds throughout the continent. Dan Anderson gave a particularly disturbing account of panhandling pelicans dying in California, and many other papers were excellent observations and reports of manipulating reproduction and behavior in breeding birds.

The overall quality of papers was very good, again demonstrating the worth of attending PSG and CWBS meetings. We hope to see everyone in Victoria BC in February, 1990.

ABSTRACTS

PANHANDLING PELICANS: ARTIFICIAL FEEDING CREATES ANOTHER WILDLIFE CONFLICT

Anderson, D. W., D. L. Jacques (Department Wildlife and Fisheries Biology, University California, Davis, CA 95616), D. L. Hunter (Wildlife Investigation Laboratory, California Department Fish and Game, Rancho, Cordova, CA 95670), and A. Baldridge (Hopkins Marine Station, Pacific Grove, CA 93950)

Recently, there has been an increasing number of Brown Pelicans overwintering at various locations along the California coast, mostly coincident with a recovering breeding population on the Channel Islands. Marinas at many locations have also greatly increased the practice of selling fish to be fed to local marine birds and mammals; but, a recent ecological problem has arisen through the co-occurrences of several new factors along with several that have involved pelicans for some time. Many pelicans die or become debilitated as a result of bacterial infections, mostly caused by a common pathogen, *Erysipelothrix rhusiopathiae*. What is most alarming is the loss of large numbers of birds, including about 34% adults. 300-400 individuals perished in the Monterey Bay area alone in 1988, but the dieoff was widespread from Oregon to Southern California, resulting in a significant and needless loss of birds, perhaps several thousand.

RECOVERY PLAN FOR THE ENDANGERED ROSEATE TERN IN THE NORTHEAST

Andrews, R. (U.S. Fish and Wildlife Service, One Gateway Center, Newton Corner, MA 02158)

In November 1987, the Roseate Tern population that breeds on the Atlantic Coast from New York to Maine and into adjacent Canada was added to the list of Federally Endangered Species. The Caribbean population was determined to be threatened. The actions were taken because the populations have declined and suitable nesting islands have been greatly reduced by human activity, competition from expanding numbers of large gulls, and predation. A recovery team has drafted a recovery plan for the northeast population and distributed it for review and comments. The plan outlines recovery strategies that will restore population levels and colony distribution, insuring survival and leading to removal from the endangered species list. The strategies include gathering of information on population dynamics and habitat needs and management actions for the use and protection of various habitats and the implementation of educational programs about the Roseate Tern. The plan must be approved by the U.S. Fish and Wildlife Service after consideration of review comments.

SEXUAL DIMORPHISM IN LEAST TERNS

Atwood, J. L., and B. A. Hamilton (Manomet Bird Observatory, Box 936, Manomet, MA 02345)

As a preliminary study of sexual dimorphism in breeding Least Terns (*Sterna antillarum*), a total of 11 characters were measured on 26 females and 27 males that were trapped on nests after being sexed on the basis of courtship feeding, copulation, or egg laying. Analysis of covariance, in

which date of nest initiation and the number of days between capture and clutch completion were included as covariates with sex, obtained significant sex differences in 4 of these characters (Head + Bill Length, Culmen Length, Bill Width, and Bill Depth). Length of the Black Tip on upper and lower mandibles was negatively correlated with the date of nest initiation; Body Mass (log transformed) was related to both date of nest initiation and the number of days between capture and clutch completion. Paired t-tests, comparing within-pair sexual dimorphism, found significant differences in Head and Bill Length, Culmen Length, Bill Width, and Bill Depth, with males being the larger sex. There was no relationship between date of nest initiation and degree of within-pair sexual dimorphism. Discriminant function analysis, based on Head Length, Bill Depth, Wing Length, and Length of White "Eyebrow", correctly classified 96% of both males and females. These results suggest that it is possible to accurately sex Least Terns without the time-consuming process of making extensive behavioral observations.

STATUS AND DISTRIBUTION OF THE LEAST TERN IN VIRGINIA - 1975-1988

Beck, R. A. (Biology Department, College of William and Mary, Williamsburg, VA 23185), J. W. Akers (Charlottesville, VA 23901), J. W. Via (Department of Biology, Virginia Polytechnic and State University, Blacksburg, VA 24061), and W. Williams (Williamsburg-James City County Public Schools, Williamsburg, VA 23186)

Small, scattered colonies of the Least Tern (*Sterna antillarum*) occur on the Eastern Shore of Virginia, and large colonies are located on Grand View Beach in Hampton and on Craney Island in Portsmouth. Survey data from fourteen consecutive breeding seasons shows a fluctuating population on the barrier islands with an overall decreasing trend. The colonies at Grand View Beach and Craney Island are increasing in number. The colonies on the west side of the Chesapeake Bay currently represent more than half of the total Virginia population. The total population shows a decreasing trend.

Mammalian and avian predation, and human disturbance has influenced production, and in some cases, prevented successful nesting. The Least Tern populations have responded positively to management strategies employed to protect nesting habitat. Several management techniques have been successfully implemented to attract terns to specific areas at the Craney Island site.

WADING BIRD USE OF A NEWLY CREATED COOLING LAKE AT SAVANNAH RIVER PLANT NEAR AIKEN, SOUTH CAROLINA

Bildstein, K. L., D. E. Gawlick, D. P. Ferral (Department of Biology, Winthrop College, Rock Hill, SC 29733), I. L. Brisbin, Jr., and G. R. Wein (Savannah River Ecology Laboratory, PO Box E, Aiken, SC 29802)

Wading bird use of a 405-ha cooling lake (L-Lake), built in 1985 at the Savannah River Plant (SRP) was compared with that of two 30-year-old lakes on the SRP: Par Pond (1130 ha) and Pond B (87 ha). Although approximately 25% of the shoreline of L-Lake was planted in 1987 with littoral-wetland vegetation in an attempt to speed the establishment of a Balanced Biological Community (BBC), L-Lake has less wetland vegetation, especially floating-leaved species such as *Nelumbo lutea*, than either of the two older lakes. Seasonal surveys of the birds using the three lakes were initiated in the

Fall of 1987. Results indicate that (1) at least six species of wading birds use L-Lake, (2) wading bird density is higher at L-Lake than at the other two lakes, and (3) wading birds represent a higher proportion of the total avian community at L-Lake than at the other two lakes. Our observations may be the result of differences in fish abundance or in fish vulnerability to predation by wading birds at L-Lake compared with the other two sites.

POST-FLEDGLING DISPERSAL OF *ARDEA HERODIAS OCCIDENTALIS* IN SOUTH FLORIDA

Bjork, R. and G. V. N. Powell (Research Department, National Audubon Society, 115 Indian Mound Trail, Tavernier, FL 33070)

Movements of post-fledgling Great Blue and Great White Herons were studied using radio telemetry during 1987 (n=12) and 1988 (n=56). Fledglings remained in the vicinity of the nest for 38+19 days in 1987 and 54 - 19 days in 1988 after which time they left Florida Bay, dispersing northward where they settled into a variety of habitats; predominantly freshwater often human-modified wetlands. After remaining in a localized area for several months, some birds have returned south to Florida Bay and the south Florida mainland. In this presentation we analyze possible factors influencing dispersal including juvenile foraging efficiency and access to foraging sites. The significance of dispersal relative to human development of south Florida will be discussed.

AGE-RELATED DIFFERENCES IN FORAGING BEHAVIOR OF HERRING GULLS

Brittingham, W. A. (Manomet Bird Observatory, Box 936, Manomet, MA 02345)

I examined foraging behaviors of Herring Gulls (*Larus argentatus*), during September - November 1987, at two feeding sites in Plymouth County, Massachusetts: a "natural" beach site and a nearby dump. Results from Manomet Beach showed that 1) foraging success and efficiency increase with age, and 2) foot paddling as a foraging method is inefficiently and less frequently used by gulls less than three years old. Preliminary results from the Manomet dump suggest similar age-related differences in foraging success and efficiency. However, observed age ratios suggest that young birds concentrate their feeding activity at the dump rather than at the beach. These findings are consistent with earlier explanations for a deferred age of first breeding. They also suggest that human refuse, as a food source that possibly increases the over-winter survival of young birds, may be a critical factor involved in the population explosion of Herring Gulls in this century. Finally, I suggest that human refuse may also play a much more crucial role during the breeding season than has been previously observed.

NEST INITIATION PATTERNS AND AGGRESSION OBSERVED IN THE BIRDsville WOOD STORK COLONY, 1987 - 1988

Bryan, A. L., and M. C. Coulter (Savannah River Ecology Laboratory, PO Box Drawer E, Aiken, SC 29802)

The availability of prey during the breeding season may affect reproductive success. Aggression within the colony can also affect reproductive success through loss of eggs and young. In 1987, high densities of prey were available and reproductive success was high. Prey densities were much lower in 1988 and reproductive success was also lower. To determine if differences

in behavior occurred within the colony among years, patterns of nest initiation, reproductive success, and occurrence of aggression, including mobbing and nest takeovers, were examined. In 1987, over 80% of the nests in the observation area with eggs eventually fledged young, nest trees were very synchronous, and only a single nest takeover by conspecifics was observed. In 1988, only 34% of the nests raised chicks to an age of six weeks and subsequent raccoon predation allowed only 12.5% to fledge young. Nest trees were far less synchronous and nest takeovers were common.

DISTRIBUTIONS OF FORAGING WADING BIRDS IN A NEW JERSEY ESTUARY

Brzorad, J., and K. Parsons (Manomet Bird Observatory, Manomet, MA 02345)

Foraging wading birds were censused along a 3 km section of the Rahway River in northeastern New Jersey from June to August 1988. Tide level and locations of individual birds were recorded on a map. The greatest number of birds were found during ebb tide. Abundance decreased from low to flood tide and was lowest at high tide. Fish and shrimp were censused during ebb and flood tides. Shore shrimp and mummichog fry were most abundant during flood tide. The opposite was true for adult mummichogs. Distributions of wading birds were non-random.

SOCIAL FACILITATION AND SYNCHRONY IN BLACK SKIMMERS

Burger, J. (Department of Biology, Rutgers University, Piscataway, NJ 08854) and M. Gochfeld (UMDNJ-Robert Wood Johnson Medical School, Piscataway, NJ 08854)

Social facilitation occurs when the frequency or intensity of behavior increases disproportionately to the number of individuals present performing this behavior. In Black Skimmers (*Rynchops niger*) vocalizations are not randomly scattered across time, but are significantly clustered. Similarly, other behaviors such as courtship feeding, copulations, sand kicking, and aggression are clustered. Breeding synchrony was greater within colonies than between colonies.

COMPETITIVE FORAGING AND HABITAT MATCHING IN HERRING GULLS

Cezilly, F. (Station Biologique, La Tour du Valat, Le Sambuc F-13200 Arles, France)

In natural habitats, many animals exploit resources competitively. An important theoretical problem in behavioral ecology is how competitors should use patchily distributed resources in order to maximize their intake rate. The ideal free distribution of competitors in a heterogeneous environment often predicts habitat matching, while the equilibrium number of consumers in a patch is proportional to resource abundance. In this study, we first use simple simulation models as tools, where individuals may or may not differ in their abilities to compete for food. According to the rule of decision for switching between patches, distribution can result in habitat matching. We then report results from experimental work with Mediterranean yellow-legged Herring Gulls and discuss them in relation to the observed distribution of wild Herring Gulls on natural feeding habitats.

RANGE EXTENSIONS OF TURNS AND BLACK SKIMMERS IN SOUTHERN CALIFORNIA

Collins, C. T., W. A. Schew (Department of Biology, California State University, Long Beach, CA 90840) and E. Burkett (California Department of Fish and Game, Bolsa Chica Ecological Reserve)

In recent years a number of bird species have either been added to the California list or have increased their breeding range. Notable among the water-oriented species is the Black Skimmer which in the last decade has steadily increased in numbers and breeding range. More recently, both Royal and Elegant Terns have expanded northward their previously restricted breeding range. The chronology of these changes will be presented along with some more detailed observations of the new breeding colonies at the Bolsa Chica Ecological Reserve near Huntington Beach, Orange County, CA.

CHANGES IN TIME BUDGETS DURING REPRODUCTION IN RELATION TO VARIATION IN FOOD AVAILABILITY FOR WOOD STORKS IN EAST-CENTRAL GEORGIA

Coulter, M. C. (Savannah River Ecology Laboratory, Drawer E, Aiken, SC 29802)

The importance of food availability in affecting reproduction has been stressed for many avian species. It has commonly been assumed that when food is plentiful, birds spend less time foraging and feed chicks more frequently than when food is less plentiful. Yet foraging is only one component of the entire time budget. As food availability varies, the entire time budget is likely to change. Among Wood Storks (*Mycteria americana*) in east-central Georgia, prey density is an important factor affecting reproductive success. I compare the time budgets of breeding storks in 1986-1988. Food was most plentiful in 1986 and least plentiful in 1988. Chicks fed at similar frequencies in all three years, but other components of the time budget, such as collecting nest material, varied considerably.

EGG SIZE AND LAYING ORDER IN BLACK-CROWNED NIGHT-HERONS, SNOWY EGRETS, AND GREAT EGRETS

Custer, T. W. (U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Gulf Coast Research Station, PO Box 2506, Victoria, TX 77902)

In 1988, nests of Black-crowned Night-Herons, Snowy Egrets, and Great Egrets in a colony in Lavaca Bay, Texas, were marked and repeatedly visited. Egg volume of individually marked eggs was determined by egg measurements. Laying order was either observed directly or determined by hatching order. The volume of Black-crowned Night-Heron eggs was related to laying order (A>B>C egg). In Snowy Egrets and Great Egrets, the A and B egg were similar in size and both were larger than the C egg.

WOOD STORK PREY IN EAST CENTRAL GEORGIA

Depkin, F. C. and M. C. Coulter (Savannah River Ecology Laboratory, Drawer E, Aiken, SC 29802)

The Wood Stork (*Mycteria americana*) population in the United States has declined in the last 50 years due largely to degradation of foraging habitat. Although early studies have examined stork prey in South Florida, there has

been no work on prey in the northern part of the range. An examination of prey of storks from the Birdsville colony in east-central Georgia, the most northern colony, was conducted during the breeding seasons 1984-1988. Prey were identified in regurgitation samples, from stomach contents, and by visual identification of species from an observation platform in the colony. Tadpoles, crayfish, and fish were the most common species recorded. Sunfish were the most abundant. All prey items were greater than 24mm in length. We compare our results with those from studies carried out in Florida.

SOCIAL BEHAVIOR, PARENTAL CARE, AND CRECHING: A CHRONOLOGY OF DEVELOPMENT IN WHITE IBIS CHICKS.

Dinep, A. (Department of Biological Sciences, Mississippi State University, Mississippi State, MS 39762)

I observed White Ibis (*Eudocimus albus*) chicks from ca. 75 nests in 1988 on Pumpkinseed Island near Georgetown, South Carolina. Approximately 1/3 of the chicks were individually color-marked. Parents continually tended chicks until about 11 days old. Chicks began to leave nests, and gathered first in small, then larger groups (creches). Siblings were seldom seen together, except during feedings. Little movement of chicks occurred between creches until about a week before leaving the island. Adults continued to feed creched chicks, but forced chicks to follow increasingly greater distances to be fed. Chicks left the island at ca. 45 days of age.

CHANGES IN NESTING POPULATIONS OF SEABIRDS AFTER FIVE YEARS OF GULL MANAGEMENT AT PETIT MANAN NATIONAL WILDLIFE REFUGE, MAINE

Drennan, M. P. (PO Box 162, Hulls Cove, Maine 04644) and D. C. Folger (4 Higgins Terrace, Bar Harbor, Maine 04609)

Petit Manan island was among the largest tern colonies in the Gulf of Maine through the 1960's and early 1970's. Following automation of the island's light station and the end of human habitation in 1972, Herring and Great Black-backed gulls began nesting in large numbers. By 1980 no terns nested on Petit Manan. In 1984 the U.S. Fish and Wildlife Service initiated a gull control program that has resulted in the recolonization of the island by Arctic, Common, and Roseate terns, as well as Laughing Gulls, Common Eiders, and Black Guillemots. Judicious use of avicide combined with full time human occupancy during the nesting season has given nesting birds, particularly terns, a major island stronghold in the Gulf of Maine.

SYMPATRY OF TWO PENGUIN SPECIES ON THE COAST OF CHILE

Duffy, D. C. (Escuela de Ciencias Ambientales, Universidad Nacional, Heredia, Costa Rica), R. P. Wilson, M.-P. Wilson (Institut Meereskunde, Duesternbrooker, Weg 20, Kiel, F.R.G.), and B. Araya M. (Instituto Oceanol., Universidad Valparaiso, Casilla 13-D, Vina del Mar, Chile)

The foraging ecologies of Humboldt (*Spheniscus humboldti*) and Magellanic (*S. magellanicus*) penguins at four sites along the Chilean coast between 29-53 degrees South differed more between sites than between species. In contrast, the two species differed in their breeding seasons and this may account for their difference in range. The two species may not have been able to extend their breeding seasons because of: limited time of contact

since the last glacial period, exclusion of the rarer species from foraging groups, and competition for nesting sites. Our study suggests that ecological relations between such species-pairs are likely to be complex and perhaps unstable over time.

FORAGING ECOLOGY OF WADING BIRDS NESTING AT LAKE HANCOCK, FLORIDA

Edelson, N. A., and M. W. Collopy (Department of Wildlife & Range Sciences, University of Florida, Gainesville, FL 32611)

We began a study of the temporal and spatial use of foraging habitats by wading birds nesting at Lake Hancock, a large, hypereutrophic lake in central Florida, in early 1988. We located seven mixed-species colonies and radio-tagged eight adult Snowy Egrets (*Egretta thula*) and three adult Little Blue Herons (*E. caerulea*). These birds were monitored to identify foraging locations during the breeding and post-breeding season. The location of foraging birds was analyzed in relation to distance from colony, habitat type, and flock size. We examined characteristics of nesting and foraging habitat of the lacustrine system, based on weekly surveys. Many of the natural habitats surrounding the lake have been severely altered by human activities; some new wetlands have been created. Snowy Egrets foraged at several of these altered, but nutrient-enriched areas, which included phosphate mines and sewage treatment plants.

INTERANNUAL VARIATION IN TIMING OF BREEDING AND MOLT IN CASSIN'S AUKLETS (*PTYCHORAMPHUS ALEUTICUS*) ON S.E. FARALLON ISLAND, CALIFORNIA

Emslie, S., P. Henderson, H. C. Carter, and D. G. Ainley (Point Reyes Bird Observatory, 4900 Shoreline Hwy., Stinson Beach, CA 94970)

Cassin's Auklets were captured in mist nets monthly from 1979-1985 at S.E. Farallon Island, California. Captured birds were banded, weighed, and examined for iris coloration and primary wing molt; wing length, gular pouch length, and bill depth were also recorded. These data were collected to obtain information on interannual variation in population structure and molt. Here, we present data on molt initiation compared to seasonal variation in food availability and timing of breeding. Cassin's auklets bred earliest on SEFI in 1979, 1981, and 1985, and latest in 1983. A greater percentage of birds captured in nets had initiated molt earlier in 1980 and 1985, and significantly later in 1983, than in all other years. Interannual fluctuations in the proportion of breeding vs. nonbreeding birds, the latter of which begins annual molt earlier than the former, may account for some of these differences.

AN EVALUATION OF THE COLONIAL BIRD REGISTER

Engstrom, R. T. (Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850)

The Colonial Bird Register (CBR) was designed to make data collected on seabird and wading bird colonies easily accessible to researchers and resource managers. The CBR has several strengths. It fills a void because colonial birds are not well-monitored by other bird-counting programs. Centralization makes data more accessible and can provide abundance data for species from a large geographical area. The CBR is potentially cost-

effective because of volunteer support and it gives a focus of the many colonial bird monitoring programs going on at the state or local level. Some of the weaknesses of the CBR include, (1) difficulty in quality control and coordination of the timing and methods used in data collection, (2) no clearly defined service, such as data analysis, in return for data provided, and (3) the chronic lack of adequate funding.

INDUSTRIAL-STRENGTH HERONS: THE BLACK-CROWNS OF BALTIMORE

Erwin, R. M., J. S. Hatfield, and W. A. Link (U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708)

We observed flights of Black-crowned Night-Herons from a large colony near the industrialized Patapsco River - Baltimore Harbor estuary from May to July 1988. Birds were followed visually from land, by boat, and small aircraft during morning and dusk periods. Even though expanses of natural, relatively undisturbed wetlands and creeks were available, most herons concentrated in the more industrialized (contaminated) areas to feed and/or roost. We statistically evaluated departure intervals and flight directions from the colony, developing a new z-test to determine whether departure directions were independent. Both interval and directional data suggest that individuals are strongly dependent upon each other when foraging. We also found some differences in group foraging in morning vs. evening.

COLONY - SITE REQUIREMENTS AND HABITAT AVAILABILITY OF HERONS IN ITALY

Fasola, M., R. Alieri, A. Gariboldi (Departmento Biologia Animale, Pz. Botta 9, Pavia, Italy)

The availability of suitable nesting habitats for waterbirds has rarely been evaluated in relation to the characteristics of colony sites. In Northern Italy, the heronries occupy small patches of seminatural vegetation in the intensely cultivated landscape. We measured 12 characteristics of the heronrie: the sites occupied by colonies of Black-crowned Night-Heron, Little Egret, and Grey Heron were above minimum thresholds of surface and width of vegetation patch, percentage of perimeter protected by canals, and safety from human disturbance. In the same region we analyzed 140 other, non-occupied patches of seminatural vegetation: only 2 non-occupied patches fulfilled the above thresholds, and were apparently still available for new heronries. In Northern Italy, the breeding herons seem to be limited by the availability of nesting sites, particularly in a region where foraging habitats abound but suitable sites are lacking.

FORAGING ECOLOGY AND BREEDING DISTRIBUTION OF A MEDITERRANEAN SEABIRD COMMUNITY

Fasola, M., G. Bogliani, L. Canova, and N. Saino (Department of Biologia Animale, Pz. Botta 9, University of Pavia, Pavia, Italy)

We studied trophic niches and the relations among foraging dispersion, prey type, and colony distribution of 4 terns and 4 gulls, breeding in the delta of river Po, Italy. The 8 species segregated their niches by their preferences for certain foraging habitats, and for prey of given size; the overlaps in the spatial and in the dietary dimensions of the niche were

complimentary. Smaller-sized species took significantly smaller-sized prey, closer to their colonies, and aggregated into larger colonies.

AN INVESTIGATION OF HUMAN DISTURBANCES IN WADING BIRD COLONIES: EFFECTS OF FREQUENCY AND DURATION OF VISITS, AND EGG MARKING ON REPRODUCTIVE SUCCESS

Frederick, P. C. and M. W. Collopy (Department of Wildlife and Range Sciences, 118 N-Z Hall, University of Florida, Gainesville, FL 32611)

During an intensive study of reproduction ecology of Ciconiiformes in the freshwater marshes of south Florida, we evaluated three specific effects of researcher disturbance. Using two nearby (within 2 km) colonies of Tricolored Herons (*Egretta tricolor*) we were able to control for size of colony, vegetative substrate, access to foraging locations, species composition and other variables. The colony visited frequently (each 4 days) showed no significant differences from the infrequently visited one (each 8 days) in dates of nest initiation, clutch size, number of young per successful nest, or overall nesting success (Mayfield method). By marking eggs with a conspicuous letter on one side, we found that all six species of herons, egrets and ibis we studied showed a highly significant tendency to turn marks down in the nest. This consistent orientation apparently did not result in reduced hatching success. By measuring heat gain in telemetered eggs exposed to direct and indirect sunlight, we derive recommendations for maximum duration of researcher visits at different temperatures.

BAND LOSS FROM SHEARWATERS: IMPLICATIONS FOR LONGEVITY ESTIMATES

Fry, D. M. (Department Avian Sciences, University of California, Davis, CA 95616), and J. D. Swenson (600 E. Pine, Seattle, WA 98122)

898 adult Wedge-tailed Shearwaters (*Puffinus pacificus*) were banded with US Fish and Wildlife Service stainless steel butt end closing bands on both legs to identify birds in an oil toxicology study from 1982-1985. 465 birds were recaptured one or two years after banding, with 30 birds having lost one band. Bands of four number series were compared for loss rates, weights, thickness, strength (force required to open band), and wear rate. Highly significant differences existed between series for band loss (2.1-9.0% of birds lost bands), band strength, band thickness, and band weight. Birds appear to open bands accidentally while digging burrows.

Other studies have estimated adult shearwater survivorship at greater than 90%. These data indicate that band loss alone could account for most missing birds and that shearwaters may be extremely long-lived. This work was supported by USDI MMS Contract 14-12-0001-29112/SB0408(a)-81-C-0509.

STRESS AND OIL-INDUCED CHANGES IN SERUM PROTEINS OF COMMON MURRES

Fry, D. M., and L. A. Addiego (Department of Avian Sciences, University of California, Davis, CA 95616)

The toxicity of oil exposure and the stress of cleaning and captivity result in marked changes in serum proteins of seabirds. Common Murres (*Uria aalge*) are robust birds that withstand well the rigors of captive stress. This is reflected in a marked immune response that would normally be suppressed in highly stressed birds. The immune response is characterized by increases in acute phase proteins (alpha and beta globulins) as well as

immunoglobulins (gamma globulins). The total serum protein levels of murres, grebes, loons, and scoters all rapidly increased in captivity, from normal values of 3-4 g/dl to as high as 7 g/dl. The increases were not accompanied by dehydration, but reflected increases in specific serum proteins and a marked decrease in prealbumin. It appears that murres may partially compensate for increases in acute phase proteins and immunoglobulins by restricting the synthesis of prealbumin to maintain relatively constant total serum protein and serum osmotic levels. This work was supported by CA Department Fish and Game Contract C-1991.

PRELIMINARY RESULTS OF DEMOGRAPHIC STUDIES ON THICK-BILLED MURRES AT COATS ISLAND, N.W.T.

Gaston, A. J. (Canadian Wildlife Service, Ottawa, Canada K1A OH3), R. D. Elliot (Canadian Wildlife Service, Box 9158, St. John's, Newfoundland, Canada), and D. G. Noble (Department of Zoology, Queen's University, Kingston, Ontario, Canada)

Several thousand young and several hundred adult Thick-billed Murres (*Uria lomvia*) have been banded on Coats Island over the past five summers to provide information on recovery rates of different age classes in Newfoundland, age at return to the colony, age at first breeding, and survival at different ages. Preliminary results of this ongoing study are presented, giving details of adult survival estimates, age at return to the colony, and estimates of the proportion of different age-classes among bird hunted in winter.

CONSEQUENCES OF NESTING IN MIXED-SPECIES GROUPS IN FOUR SPECIES OF BEACH-NESTING BIRDS FROM SOUTHEASTERN PERU

Groom, M. J. (Department of Zoology, University of Florida, Gainesville, FL 32611)

In an unusual assemblage of three waterbird species and one species of colonial nighthawk (*Rhynchos niger*, *Phaetusa simplex*, *Sterna superciliaris*, and *Chordeiles rupestris*) along the Rio Manu, Peru, hatching success varied significantly among and within beaches during the 1987 nesting season. The majority of nest losses were to avian predators, particularly *Daptrius ater*. *Chordeiles* did not actively defend nests, whereas the remaining three species were highly aggressive toward potential predators. Predation attempts were frequent and hatching success was influenced by nest position relative to other nests. *Chordeiles'* hatching success was higher if nests were near successful nests of aggressive species and lower if near unsuccessful nests of all species. In most cases, all nests of aggressive species on a beach either succeeded or failed. It appears that the relationship between *Chordeiles* and the aggressive species is parasitic.

POPULATION CHANGES IN CAMARGUE ARDEIDS. THE EFFECT OF CLIMATIC CONDITIONS IN THE WINTERING AREAS

Hafner, H. (Station Biologique, La Tour du Valat, Le Sambuc, F-13200 Arles, France), and J. P. Wallace (RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL, U.K.)

The numbers of tree-nesting herons (Little Egret, Black-crowned Night-Heron, Squacco Heron, and Cattle Egret) breeding in the Camargue have been determined annually since 1968. For three species, meteorological variables in the main wintering areas appeared to affect the breeding populations in subsequent years. For the Night-Heron and Squacco Heron hydrological conditions in Africa seem important whilst for the Cattle Egret winter temperature in the Camargue appears to be a valuable key variable. For one species, the Little Egret, no correlates were found with population changes. This may be a consequence of the very wide wintering range of the species.

INDIVIDUAL VARIATION IN BEHAVIOR AND BREEDING SUCCESS OF NORTHERN FULMARS

Hatch, S. A. (U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center, 1101 E. Tudor Road, Anchorage, AK 99503)

In a sample of breeding Northern Fulmars (*Fulmarus glacialis*) observed in each of 6 years, some pairs were more successful than expected, and some less so, on the hypothesis that all pairs had the same probability of breeding success in a given year. Several factors were considered that could account for the observed individual variation. Pairs thought to include at least one bird with no breeding experience were less successful than experienced pairs, but the effect depended largely on the color phases of the individuals. Late layers were more successful than were early layers, possibly because delayed nesting ensured that food availability was adequate for successful incubation. The mean duration of incubation shifts, attendance by the off-duty partner, and the shares of the sexes in incubation all showed substantial variation among pairs, and egg loss was frequently associated with an unusually long incubation shift. Prelaying attendance patterns were correlated with the breeding success of individuals, but not always as expected on the hypothesis that increased time spent on land was an indication of individual quality. The possibility should be considered that consistency of behavior per se is important.

POOR CORRELATIONS BETWEEN ANTARCTIC KRILL AND THEIR PENGUIN PREDATORS: SAMPLING BIASES OR "SUBOPTIMAL" PREDATORS?

Heinemann, D. (Manomet Bird Observatory, Manomet, MA 02345), G. L. Hunt (Ecol. & Evol. Biology, University of California, Irvine, CA 92717), and I. Everson (British Antarctic Survey, Cambridge, CB3 0ET, England)

We have found the at-sea correlation between krill and penguin density in Antarctica to be poor, which may indicate that penguins are "suboptimal" foragers or that our sampling techniques were inadequate. The correlations might have been higher if we had, 1) sampled at night when krill are at the surface, 2) estimated the density of krill actually available to penguins, and 3) estimated the density of penguins actually foraging. However, we found that correlations were only slightly or not at all improved when we partially accounted for these potential biases. Thus, we consider the

possibility that penguins may be much less efficient foragers than we had expected.

WHITE-FACED IBIS DDE-RELATED REPRODUCTIVE PROBLEMS CONTINUE AT CARSON LAKE, NEVADA

Henny, C. J., and (Pacific N.W. Field Station, 480 S.W. Airport Rd., Corvallis, OR 97333) and G. B. Herron (Nevada Dept. of Wildlife, Reno, NV 89520)

Organochlorine, mercury, and selenium contamination was studied in White-faced Ibis (*Plegadis chihi*) nesting at Carson Lake, Nevada in 1985 and 1986. DDE was detected in 138 of 140 eggs sampled: Eggshell thickness was negatively correlated with residues of DDE. DDE residues in ibis eggs, unlike residues in most other wading bird eggs from the Great Basin have not declined during the last decade. At DDE levels in eggs above 4ppm (wet weight), clutch size and productivity decreased, and the incidence of cracked eggs increased. Assuming that 4ppm DDE is the critical residue level, 40% of the nesting population in 1985 and 1986 was adversely impacted by DDE, with a net loss of 20% of the population's expected production. Most eggs containing high levels (up to 29ppm) also contained DDT, which implies the source was recently-used DDT. No evidence of breeding ground DDE-DDT contamination was found.

FOOD HABITS OF BREEDING HERONS AND EGRETS IN EVERGLADES NATIONAL PARK

Jewell, S. D. and G. T. Bancroft (National Audubon Society Research Department, 115 Indian Mound Trail, Tavernier, FL 33070)

We compared Great Egret (*Casmerodius albus*), Snowy Egret (*Egretta thula*), and Tricolored Heron (*E. tricolor*) regurgitation samples and feeding locations between 1987 and 1988 from the Rodgers River Bay colony in west-central Everglades National Park. We followed adults by airplane from the colony to foraging sites and observed flight line counts from the colony. For Great Egrets and Tricolored Herons, we found significant differences between years in prey species composition and importance by biomass. Both species generally fed northwest of the colony in 1987 and northeast of it in 1988. For Snowy Egrets, composition and biomass differed less, and differences in foraging locations (northwest in 1987, northwest and northeast in 1988) also differed less.

ESTIMATING LEAST TERN CHICK SURVIVAL USING MARK-RECAPTURE METHODS

Kirsch, E. M. (Biological Sciences Division, University of Montana, Missoula, MT 59801)

Survival of chicks to fledgling is a key parameter of reproductive success. Three mark-recapture methods were used to estimate survival of Least Terns (*Sterna antillarum*) chicks on two habitats along the lower Platte River in Nebraska. The Jolly-Seber mark-recapture method was used in 1987, but failed to give meaningful survival estimates due to small sample sizes and violated assumptions. I developed another method for calculating survival from the 1987 mark-recapture data. By treating all chicks as if they hatched on the same day, I calculated capture probabilities for each age class as the number of chicks captured in that class that were also captured later divided

by the total number of chicks in that class captured at some later date. Number of survivors in each age class was estimated as the number captured divided by the capture probability. This method under-estimated survival. In 1988, intensive one-day Lincoln-Peterson estimates were made when most chicks were >2 weeks old. Young were marked and each colony observed for 24 hours to insure that there was no mortality before taking the recapture sample. This procedure appears to give more realistic survival information than other methods if hatching success and chronology is known.

OVERVIEW OF GULL IMPACT ON ATLANTIC COAST WATERBIRDS

Kress, S. W. (Research Department, National Audubon Society, Ithaca, NY 14850)

Twenty colonial waterbird biologists from Maine to South Carolina responded to a questionnaire designed to assess the impact of Herring and Great Black-backed Gulls on colonial waterbirds. Within their study areas, 56% reported increased Great Black-backed Gull populations, while 85% reported stable or declining Herring Gull populations. Eighty-nine percent know of colonial waterbird colonies that suffer negative effects from, Herring and/or Great Black-backed Gulls. Eighty percent responded that if gull populations were lower, Common, Arctic, Roseate, and Least Terns would benefit and that without such action, these populations would decline. In addition to terns, Piping Plovers, Laughing Gulls, Common Eiders, Leach's Storm-Petrels and several species of herons would also benefit. Sixty-six percent believe that there is now an urgent need for gull control at specific sites and 33% believe that control is not necessary now, but may be necessary in the future.

NOAA'S SEABIRD MAPPING PROGRAM: ATLAS AND COMPUTER PRODUCTS

LaPointe, T. F., G. J. Divoky, E. D. Archer, T. A. Gill, M. D. King, R. J. Wolotira (Strategic Assessment Branch, Oceans Assessments Division, National Oceanic and Atmospheric Administration, 11400 Rockville Pike, Rockville, MD 20852,), and A. L. Sowls (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, 202 Pioneer Avenue, Homer, AK 99603)

For the past five years information has been compiled on the spatial and temporal distributions of seabirds along the west coast of North America from the Beaufort Sea through the Baja Peninsula. This information is being published in two NOAA strategic assessment data atlases: the *Bering, Chukchi, and Beaufort Seas Data Atlas* (1988), and the *West Coast of North America Data Atlas* (1989). Additionally, the information is being digitized and organized with NOAA's micro-computer based "Computer Mapping and Analysis System" (Cmas) for distribution to scientists and resource managers within government, academic, and private sectors. In 1989 NOAA will begin a cooperative effort with the U.S. Fish and Wildlife Service to synthesize data on the colonial and pelagic abundances of seabirds. It is intended that this information also be organized with the Cmas system for selected distribution.

BIASES IN AGE AND SEX RATIOS OF SEABIRDS OFF THE NORTH CAROLINA COAST

Lee, D. S. (North Carolina State Museum, PO Box 27647, Raleigh, NC 27611)

Samples of 20 seabird species collected since 1976 off North Carolina's Outer Banks reveal strongly biased age or sex ratios. For one species, at least, *Fulmarus glacialis*, bias was for both age and sex with a 2:1 ratio of females to males and over 95% were immature. Seasonal variation in abundance of age classes was recorded for transoceanic and transequatorial migrants as well as for species dispersing locally in coastal waters. These biases appear to result from dispersal timing and distance of movement of different sexes and age classes. General age class segregation limiting foraging competition between population components has advantages for individual and long term population survival. No single pattern dominates but this is not surprising because the sample represented birds from three orders, species with diverse migration strategies, and assemblages from different hemispheres. Nevertheless, biased ratios seem widespread in seabirds. This supports ideas proposed by Gauthreaux in 1978 on the role of behavioral dominance in migration patterns.

THE BRITISH AND IRISH SEABIRD COLONY REGISTER

Lloyd, C. (Nature Conservancy Council, Aberdeen, Scotland, U.K.)

The British Seabird Group established a Seabird Colony Register in 1984 with the aim of bringing together published and unpublished data on seabird breeding populations in Britain and Ireland. With support from the Nature Conservancy Council, a survey of the entire British and Irish coastlines was organized, and undertaken by volunteers mostly during the summers of 1985-87. This provided up-to-date information for the Register, and data that could be compared usefully with the results of the most recent previous complete survey, Operation Seafarer in 1969-70. Analysis of population trends based on data from the Seabird Colony Register is currently underway.

THE REPRODUCTION OF FOOD-STRESSED GULLS ON SABLE ISLAND, NOVA SCOTIA

Lock, A. R. (Canadian Wildlife Service, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, Nova Scotia, Canada B2Y 4A2)

The reproductive success of increasing populations of Herring (*Larus argentatus*) and Great Black-backed (*L. marinus*) gulls was examined on Sable Island, 100 miles off the coast of mainland Nova Scotia. Black-backs were more successful but reproductive success and chick growth rates were lower than have been reported elsewhere. Major dietary differences between the species were documented: Herring Gulls fed primarily on fish and marine invertebrates while Black-backed Gulls fed to a greater extent on other birds and seals. Time budgets of breeding pairs with broods having differing food demands showed that to satisfy the maximal food demand of a full brood a Herring Gull pair must leave the nest unattended 70% of the time; a Black-backed Gull pair provisioning a brood with maximal food demand left the nest unattended only 30% of the time. The timing of chick mortality in this and other gull populations is related to breeding success and food availability. The large impacts of these gulls on Sable Island terns led to a 3-year study of tern breeding under heavy predation pressure; that study will be continued after reductions of gull numbers on the island.

DESCRIPTION AND RATES OF OCCURRENCE OF TERATOGENIC CONDITIONS IN DOUBLE-CRESTED CORMORANT (*PHALACROCORAX AURITUS*) AND CASPIAN TERN (*STERNA CASPIA*) EMBRYOS FROM COLONIES OF THE GREAT LAKES: SUMMARY OF 1987-88 FIELD OBSERVATIONS

Ludwig, J. P. and H. Kurita (Ecological Research Services, Inc., 512 N. Lincoln, Bay City, MI 48708)

Systematic assessments of eggs that fail to hatch have revealed many specific deformities in embryos occurring at rates far above those reported for hatched young of any colonial waterbird species on the Great Lakes. We found nineteen teratogenic conditions in embryos, but have only seen hatched chicks with five types of deformities. Very few deformed embryos survive long enough to hatch. Studying hatched young underestimates the true rate of teratologies by at least one to two orders of magnitude. The same deformities we found have been reproduced in domestic species by feeding PCB mixtures to test birds. We found deformities occurring at elevated rates in colonies located in known Great Lakes contamination "Hot Spots". We suspect teratogens in the PCB, dioxin, furan, groups of chemicals as contributing causes of these phenomena.

FORAGING PATTERNS BY NESTING WADING BIRDS AT A POND ON STATEN ISLAND, NEW YORK CITY

Maccarone, A. D., and K. C. Parsons (Manomet Bird Observatory, Manomet, MA 02345)

Goethals Bridge Pond (GBP) is a shallow, 5 ha pond located in NW Staten Island, New York City. This permanent but seasonally-fluctuating pond is an important foraging area for some of the 1200 pairs of wading birds that breed on three nearby islands. During 120 h of observations over the 1987 and 1988 nesting seasons, we examined the relationship between several biotic and abiotic variables, and the size and species composition of foraging populations at GBP. We found interspecific differences in the numbers of foraging birds through the nesting season. Different factors accounted for the foraging patterns observed for the three most common species: Snowy Egrets, Great Egrets, and Glossy Ibises. We discussed the importance of GBP in terms of its proximity to the breeding colonies, and in relation to nearby estuarine foraging areas.

RENESTING BY CALIFORNIA LEAST TERNS

Massey, B. W. (Department of Biology, California State University, Long Beach, CA 90840), and Jack Fancher (U.S. Fish & Wildlife Service, 24000 Avila Road, Laguna Niguel, CA 92656)

Least Terns (*Sterna antillarum browni*) renest routinely after loss of eggs or chicks. Renesting by terns in a group of seven colonies in Los Angeles and Orange Counties was documented over a 7-year period. The birds generally renested at the same or an adjacent colony (89%). The major cause of renesting was loss of chicks, mostly attributable to predation. Loss of eggs was rare until 1986, but rose significantly in 1986 and 1987 with increased predation by red foxes (*Vulpes fulva*) and American Crows (*Corvus*

brachyrhynchos). The interval between loss of eggs and renesting was 4-16 days; after chick loss, 5-12 days. Evidence of group adherence was found in renesting patterns at several colony sites.

NON-LINEAR DYNAMICS OF CHRISTMAS BIRD COUNT DATA FOR SOUTHEASTERN U.S. WADING BIRDS

McCrimmon, D. A. (Mount Desert Island Biological Laboratory, Salsbury Cove, ME 04672), and G. S. Butcher (Cornell Laboratory of Ornithology, Ithaca, NY 14850)

The degree of determinism or stochasticity associated with time-series data, e.g., annual population statistics, can be evaluated with graphs of lagged measurements. The predictability of future trends can thus be evaluated and, in the case of ecological variables, the complexity of the underlying community mosaic in which a species is embedded may be expressed. Previously, McCrimmon assessed data for breeding populations of Wood Storks in southern Florida. Here, we evaluate CBC data for other wading bird populations in several southeastern states with varying results: For example, wintering Snowy Egret populations in Louisiana and Texas and Cattle Egret populations in Florida exhibit strong monotonicities and appear amenable to deterministic models. On the other hand, Snowy Egret populations in Florida and Cattle Egret populations in Louisiana and Texas show more turbulent dynamics.

CAPTIVE WHITE IBISES FORAGING ON FIDDLER CRABS FROM ARTIFICIAL BURROWS: THE EFFECT OF IBIS BEHAVIOR AND FIDDLER CRAB BURROW MORPHOLOGY ON PROBING SUCCESS

McDowell, S. G. (Savannah River Ecology Laboratory, Drawer E, Aiken, SC 29801) and K. L. Bildstein (Department of Biology, Winthrop College, Rock Hill, SC 29733)

We observed the capture of male and female fiddler crabs (*Uca pugilator*) by captive White Ibises (*Eudocimus albus*) probing artificial burrows of varying depths and angles from the surface, simulating burrows of sand fiddler crabs of southeastern salt marshes. Our observations showed that ibises oriented their culmens in different positions when probing the slanted burrows. Three major behavioral categories were determined for the head and culmen orientation: an approach from the side such that the face and culmen were rotated 90 degrees, an approach from the front of the burrow, and a "between the legs" approach whereby the bird's bill entered the burrow along its curvature. Overall, the side approach was used most frequently and the front door approach was observed least often. These distinctively different approaches to probing the burrows may, in part, be due to the length and curvature of the ibises' culmens.

THE CATALOG OF ALASKAN SEABIRD COLONIES

Mendenhall, V. M. (U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, AK 99503), and A. L. Sowls (USFWS, 202 Pioneer Ave., Homer, AK 99603)

The coast of Alaska supports over 1300 breeding colonies of seabirds comprising more than 40,000,000 birds. When oil exploration started on the

continental shelf the numbers and distribution of seabirds were surveyed for the first time. The Catalog of Alaskan Seabird Colonies was published in 1978. Half the data have been updated and 360 new colonies have been added since then. The Catalog has been converted to an automated database on a Data General MV8000 computer. Data on each observation are stored in 6 files: seabird species and numbers, colony name and location, observers, literature sources, footnotes, and digitized maps. Codes are entered to describe observation methods and quality of the data. Sequential observations on one colony are retained, but the best estimate is identified. Outputs include a report giving colony location and bird numbers for any or all species and for any portion of the state, along with supplementary data from all files. Maps show colony locations or species densities. Copies of field notes and reports can also be provided.

THE CONFOUNDING OF ADOPTION STUDIES IN THE COMMON TERN

Morris, R. D. (Department of Biological Sciences, Brock University, St. Catharines, Ontario, L2S 3A1, Canada)

Current dogma suggests that intra-clutching hatching patterns reflect adaptive advantage to parents by permitting brood reduction as required. However, chicks disadvantaged in a home brood may be selected to depart and actively seek adoption elsewhere. As parents resist adopting foreign chicks, attempts at acceptance ought not to be randomly distributed among potential foster broods. Some general predictions include (1) lower feeding rate to third-hatched chicks, (2) greater frequency of departure by third-hatched chicks, and (3) acceptance in broods containing younger chicks. Despite complications that included heavy predation by Herring and Ring-billed Gulls, and the loss of Common Tern chicks carried away from home broods by fish-stealing adult terns, these predictions were supported.

RELATIONSHIPS BETWEEN CLIMATIC VARIABILITY, REPRODUCTION, AND NUMBERS OF BLACK-LEGGED KITTIWAKES AT BREEDING COLONIES IN NORTHWESTERN ALASKA

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In 1975-1988 Black-legged Kittiwake (*Rissa brevirostris*) reproduction at Bluff, Alaska has varied markedly and has been well correlated with spring air temperatures. Reproductive failures have occurred following abnormally cool springs and exceptionally warm springs. The most likely causal sequence is that air temperatures effect ice break up and spring warming patterns in coastal waters, and in turn sea temperatures influence abundance and availability of fish prey. Interannual variability in reproduction at other northern colonies adjacent to the Alaska Coastal Current generally has paralleled that at Bluff. Although repeated reproductive failures occurred at Bluff in the past decade, numbers of adults at the colony have not demonstrated any directional decline.

THE CANADIAN WILDLIFE SERVICE SEABIRD COLONY REGISTRY

Nettleship, D. N., and J. W. Chardine (Canadian Wildlife Service, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., B2Y 4A2, Canada)

A computerized registry of seabird colonies in the NW Atlantic area is under development for use on a microcomputer. A "systems analysis" approach was used in the design phase and will be briefly discussed. The process resulted in a relational data structure consisting of a master file containing census data for a single species, at one location and time, with details of the location, species, observers, and written reports split into other files. Key codes in the master file link master records to records in other files. Data input is managed by a series of programs written in DBASE III language that present input screens to the user, validate data, manage the various subfiles in the relation design and finally apply the data to the database. Data will be retrieved, reported and statistically analyzed using software that reads DBASE III files (e.g., FOCUS, STATGRAPHICS, SYSTAT).

PHILOPATRY AND PROSPECTING IN THICK-BILLED MURRES

Noble, S. (Queen's University, Kingston, Ontario K7L 3N6), A. Gaston (C.W.S. Ottawa, Ontario, K1A 0H3, Canada), and R. Elliot (C.W.S. PO Box 9158, St. John's, Newfoundland, A1A 2X9, Canada)

The biology of known-age Thick-billed Murres was studied at a breeding colony in northern Hudson Bay. Individuals, identified by band number, were observed throughout the breeding season. We recorded the sites occupied and visited, social behavior, and breeding attempts. We found evidence of philopatry to natal ledge. Chicks banded on a particular ledge tended to be resighted on that ledge in subsequent years, and band sequences of prospecting murres were clumped in different areas of the colony. We examine factors that may influence recruitment to a particular site, including site availability, sex, age, and experience.

POLLUTION MONITORING IN PUGET SOUND UTILIZING GREAT BLUE HERONS

Norman, D., G. Cobb, R. Kendall (Institute of Wildlife Toxicology, Western Washington University, Bellingham, WA 98225), and D. Kane (U.S. Fish and Wildlife Service, 2625 Parkmont Lane SW Building B-3, Olympia, WA 98502)

Contaminant levels are being studied in the resident Great Blue Heron (*Ardea herodias fanninni*) populations in Puget Sound. The ecological and toxic chemical exposure characteristics indicate that long term pollution monitoring is possible. Improved analytical and toxicological techniques combined with nonlethal sampling allow for more meaningful data to be collected. Such toxicological information has the potential to be combined with population data to form computerized management systems. This should assist agencies in planning coastal zone development, natural resource utilization, and evaluation of toxicological risks of toxic chemical exposure to humans.

GROWTH RATES AND BROOD SIZE IN SNOWY EGRETS

Parsons, K. C., and K. P. Vance (Manomet Bird Observatory, Box 936, Manomet, MA 02345)

We studied growth rates of Snowy Egret (*Egretta thula*) nestlings in New York and Massachusetts in 1982, 1987, and 1988. We examined the relationship between growth rate and brood size for first-, second-, and third-hatching chicks. First-hatching chicks generally grew at a fixed (and presumably optimal) rate regardless of the presence of 1-4 broodmates. Second-, and third-hatching chicks sometimes grew faster in the presence of a younger sibling compared to nests in which the second-, or third-hatching chick was the youngest nestling. We explore proximate factors such as the possible stimulus broodmates may provide older siblings to increase begging frequency.

THE NORWEGIAN SEABIRD REGISTRY

Nygard, T. (The Norwegian Institute for Nature Research, Tungasletta 2, N-7004, Trondheim, Norway)

The system architecture, software, main responsibilities , and applications of the Norwegian Seabird Registry are described. Databases for breeding, molting, and wintering seabirds and waterfowl are continuously updated, likewise is an open-sea database for pelagic distributions. Personal computers are used to enter census data, and to maintain location databases, related files, and lookup tables, using the *Dataflex* database program. Census data files are transferred to a *Micro Vax II* minicomputer via network for further processing. On this, *SPSSX* is used for statistics and to produce report listings, and also to produce plot-files for computerized map drawing, using *Uniras* and *Supermap* programs. In oil spill emergency situations, the data and maps are readily accessible to the pollution control authorities via *Telefax*. The seabird database is also a tool for planning and managing of the coastal environments, for monitoring of seabird and waterfowl populations, as well as for oil-related environmental impact assessment studies.

HIGH ORGANOCHLORINE AND SELENIUM LEVELS IN CALIFORNIA HERON AND EGRET EGGS

Ohlendorf, H. M., and K. C. Marois (U.S. Fish and Wildlife Service, c/o Department of Wildlife & Fishery Biology, University of California, Davis, CA 95616)

Exceptionally high concentrations of DDE were found in Black-crowned Night-Heron (geometric mean 8.62 ppm, wet wt) and Great Egret (24.0 ppm) eggs collected from the Imperial Valley (Salton Sea), California in 1985. DDE concentrations in these eggs, as well as in many of those from two San Francisco Bay night-heron colonies, were higher than those associated with reduced reproductive success of night-herons (8 ppm). In addition, shell thickness of night-heron eggs collected from the San Joaquin Valley and from San Francisco Bay during 1982-1984 was significantly less than pre-DDT thickness and was negatively correlated with DDE concentration. Mean selenium concentration in night-heron eggs from Salton Sea (1.10 ppm, wet wt) was significantly higher than in eggs from three locations in the San Joaquin Valley.

LEAD POISONING IN WATERBIRDS: THE AMERICAN VERSUS THE EUROPEAN SITUATION

Pain, D. J. (Station Biologique de la Tour du Valat, Le Sambuc, I3200 Arles, France)

Lead poisoning of waterfowl through the ingestion of spent lead gunshot has been a controversial issue for many years. Decades of research in the USA have led to a federal regulation banning the use of lead gunshot for waterfowl hunting in all the USA by 1992. Although hunting pressure in Southern Europe is intense, there has been comparatively little research into this problem. This paper will present the results of recent research into lead poisoning of waterfowl, waders, and rallidae in the Camargue, illustrating the severity of the problem in this region. Factors affecting the susceptibility of waterbirds to shot ingestion will be discussed. Patterns of lead poisoning and species affected in the USA and in Europe will be compared.

ABUNDANCE, DISTRIBUTION, AND HABITAT ASSOCIATION OF THE MARBLED MURRELET IN THE FORESTS OF THE REDWOOD REGION OF CALIFORNIA AND SOUTHERN OREGON DURING 1988

Ralph, C. J., P. W. C. Paton (Redwood Sciences Laboratory, U.S. Forest Service, Arcata, CA 95221), and G. Strachen (Ano Nuevo State Preserve, Pescadero, CA 94060)

We developed and implemented a survey of this rare sea bird in the forests between Monterey County, California and extreme southern Oregon. Our objective was to determine its geographical distribution, abundance, and habitat association. It was found in areas with older trees, primarily within 20 km of the coast. Two major population centers were found: one in Santa Cruz and San Mateo counties, in state park lands; and the other largely within the boundaries of the redwood parks in Del Norte and Humboldt counties. We also found several small populations on private, as well as on other state and federal lands. We detected no birds over a large area of its probable former range between southern Humboldt County and San Francisco. Most birds were in or near older forests, but some areas of old-growth forests, lacked the bird. Future research and management goals will be outlined.

POPULATION STATUS AND ECOLOGY OF COMMON TERNS IN LAKE CHAMPLAIN

Rimmer, C. C. (Vermont Institute of Natural Science, Woodstock, VT 05091)

Lake Champlain's small, isolated breeding population of Common Terns (*Sterna hirundo*) has been monitored since 1981. This population has experienced a steady decline from ca. 1775 nesting pairs in 1981 to ca. 55 pairs in 1988. Reproductive success has been virtually nonexistent, with only 40 chicks fledged since 1983. Direct and indirect effects of nocturnal predation by Great Horned Owls and Black-crowned Night-Herons appear to be the primary causes of reproductive failure. Tiny thief ants caused high nestling mortality in one colony in 1988. Nocturnal desertions by all nesting adults occurred in each colony on a nightly basis, delaying incubation of some clutches nearly 2 weeks. A limited banding and color-marking program was conducted in 1987 & 1988. Nearly 70% of adults banded in 1987 returned in 1988. There appears to be very little recruitment or

immigration into the population. Renesting patterns, intercolony movements, and post-breeding dispersal will be discussed, as will management strategies to protect this endangered population.

THE ADAPTIVE SIGNIFICANCE OF NEST INITIATION DATES: EXPERIMENTAL MANIPULATIONS OF THE TIMING OF HATCH

Rohwer, F. C. (Appalachian Environmental Laboratory, University of Maryland, Frostburg, MD 21532)

I moved eggs of Forster's Terns (*Sterna forsteri*) from one colony to another colony to manipulate the timing of hatch. These manipulations advanced the earliest hatching dates by 15 days for terns nesting in Chincoteague Bay, MD. This experiment allowed me to test the hypothesis that the onset of laying is determined by the earliest time that parents can feed their young. All terns accepted the fostered eggs and appeared to make the shift to caring for young. Hatching success was similar for the early hatch-date and normal hatch-date eggs. However, only 38% of early hatched young fledged, a sharp contrast to the 72% fledging success for normal hatched young. Growth of early hatched survivors was slower than normal hatched young, but the difference was not significant. These preliminary data suggest that optimal nest initiation dates may be set by how early parents can feed their young.

RESURVEY OF WADING BIRD COLONIES IN FLORIDA

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A statewide survey of colonial breeding sites for herons and their allies in Florida was last conducted in 1976-78. Following a pilot survey in 1987, we began a systematic aerial resurvey of the state in 1988. Using LORAN-C and 1:150,000 scale maps, we followed E-W transects spaced 5 km apart. The present status (active or vacant) of known colony sites was determined, and size of each colony was estimated and augmented using aerial photos. Aerial surveys were followed by ground visits or helicopter surveys whenever possible. Our current emphasis is on accurately locating active colony sites and determining species composition for habitat protection efforts. Following completion of the survey, future work will emphasize monitoring of changes in colony size at selected colonies and calculating colony turnover rates.

EVIDENCE FOR PREY LIMITATION OF COMMON AND ROSEATE TERN REPRODUCTION

Safina, C. (National Audubon Society, 306 South Bay Avenue, Islip, NY 11751), J. Burger (Department of Biology, Busch Campus, Rutgers University, New Brunswick, NJ 08903), M. Gochfeld (Robert Wood Johnson Medical School, Environmental and Community Medicine, Piscataway, NJ 08854), and R. H. Wagner (Edward Grey Institute of Ornithology, Oxford OX1 3PS, U.K.)

We tested hypotheses that prey population fluctuations limit reproduction in Common (*Sterna hirundo*) and Roseate (*Sterna dougallii*) terns. In a 2-year study, both species laid earlier, delivered more fish/hour to

nests, grew faster, and survived better in the year when prey fish populations were higher as measured by sonar. Common, but not Roseate, terns had larger clutches and broods in the better food year.

EFFECT OF EXPERIMENTAL MANIPULATION OF VEGETATION ON NEST SITE SELECTION IN SOOTY TERNS

Saliva, J. E., and J. Burger (Department of Biology, Rutgers University, PO Box 1059, Piscataway, NJ 08855)

Sooty Terns (*Sterna fuscata*) are ground-nesting seabirds that typically nest on exposed, unvegetated areas. However, at Culebra Archipelago, Puerto Rico, these terns nest under very dense vegetation cover. In 1986 Sooty Terns did not nest in three experimentally cleared plots. In 1987 they did not use an additional newly cleared spot, but they did use the plots that were cleared in 1986, which had revegetated. Prior to the breeding season, the revegetated plots were manipulated, and the terns preferred nesting on the plots with less vegetation. Mean air and ground temperatures in exposed areas in 1986 were significantly higher than in vegetated areas, and thermoregulatory behaviors comprised only 2% of all behaviors showed by terns, suggesting low incidence of heat stress. In Culebra, contrary to other islands, Sooties are exposed to 12 predators. We suggest that at Culebra, due to high temperatures and abundance of predatory species, Sooty Terns are selecting a cooler and safer habitat under vegetation.

POPULATION AND DISTRIBUTION OF FORAGING WHITE IBIS IN THE WATER CONSERVATION AREAS OF THE EVERGLADES

Sawicki, R. J., W. Hoffman, and G. T. Bancroft (Research Department, National Audubon Society, Tavernier, FL 33070)

We used systematic reconnaissance flights to census populations and map distributions of White Ibis (*Eudocimus albus*). Surveys in the 1986-1987 dry season showed populations ranging from 10654 to 82093 with the peak in March. During the 1987-1988 dry season, estimates ranged from 12367 to 88620 with the peak in January. White Ibis responded to shifting hydropatterns by moving their foraging locations to follow the drying edge. White Ibis were found in habitats of tree islands with dense grass more consistently than any other and tended to avoid open grass and tree islands with open grass habitats. White Ibis consistently avoided dry areas, but were found in both wet and transitional wetlands. White Ibis tend to form larger, monospecific flocks than do other wading bird species.

RADIO TRACKING OF WHITE-TAILED TROPICBIRDS OVER THE CARIBBEAN SEA

Schaffner, F. C. (Department of Biology, University of Miami, Coral Gables, FL 33124), M. R. Fuller (U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708), C. J. Pennycuick (Department of Biology, University of Miami), and H. H. Obrecht, III (Patuxent Wildlife Research Center).

Sixteen White-tailed Tropicbirds (*Phaethon lepturus*) were radiomarked in June 1987 and May 1988 at the Culebra National Wildlife Refuge, Puerto Rico. Transmitters were attached to birds using harness and glue to hold 9-11 gram packages on the birds' backs, or glue with electrical tape and thread to tie

6 or 8 gram packages ventrally on rectrices. Tail-mounted transmitters proved most useful. Birds were tracked over the open sea from a Cessna 182 equipped with side-ways mounted 4-element Yagi antennas, arranged in a null-peak configuration, and connected to a scanning receiver. Locations were estimated by recording bearing and distance from at least 1 of the 3 VOR/DME aeronautical navigation beacons at San Juan, St. Thomas, and St. Croix. In 1987 one bird was tracked as far as 155 km north of San Juan. In 1988 the longest tracking distance was 116 km south of the nesting colony. Tropicbirds were tracked from 1-4 days ($x = 2.1$) in 1988, when we obtained an average of 2.6 locations per radiomarking effort.

POPULATION TRENDS AND HABITATS OF GREAT BLUE HERONS AND GREAT EGRETS IN MICHIGAN'S GREAT LAKES

Scharf, W. C. (Department of Biology, Northwestern Michigan College, Traverse City, MI 49684)

I conducted an aerial search of the four Michigan Great Lakes coasts, the three connecting rivers, and all islands during the nesting season of 1987. All searches went up to 1 km inland, and ground counts were made at 66% of the colonies. I found 1064 Great Blue Heron and 31 Great Egret nests in 33 colonies. Great Blue Herons have increased 62% since 1977. Great Egrets have remained stable, but moved their colonies northward. Species and DBH of nest trees as well as ground cover assessment was frequently an indication of the longevity of the nesting colony at each colony site. Comparison of colonies from south to north indicates great differences in colony stability, phenology, and foraging sites as well as different needs for land use zoning to protect the nesting bird populations.

THE RELATIONSHIP BETWEEN FEEDING VARIABILITY, CONVERSION EFFICIENCY AND CHICK GROWTH IN FOUR TROPICAL SEABIRDS BREEDING AT MIDWAY ISLANDS

Shea, R. E. (Department of Biology, Randolph-Macon College, Ashland, VA 23005) and R. E. Ricklefs (Department of Biology, University of Pennsylvania, Philadelphia, PA 19104)

A 3-year study of seabird growth and feeding ecology at Midway Islands suggests that the variation in individual growth performance over the entire development period can be generated over a period of 0.6 to 3.9 days as a result of variation in food delivered to the chick in any given 24-hour period. Further, there was a significant negative correlation between this period over which individual variation is generated and the conversion efficiency of the chick. A low conversion efficiency suggests that a missed meal results in lower weight loss per unit time. Our data suggest that low conversion efficiencies may be an adaptation (and is clearly adaptive) to foraging at great distances from the nest in an unpredictable environment.

DURATION OF COURTSHIP FEEDING OF COMMON TERNS

Shields, K. M. (Manomet Bird Observatory, Box 936, Manomet, MA 02345)

Thirteen pairs of Common Terns (*Sterna hirundo*) were observed at Plymouth Beach, Plymouth County, MA during June 1988. Observations, taken between 0610 and 0910, were begun on each pair on the day they laid their first egg (day 0). Courtship feeding rates (CFRs) were measured as the

number of feedings per hour of female incubation. The CFR mean for days 0 and 1 combined was significantly higher ($P=0.0001$) than the CFRs on subsequent days. However, CFR was not related to clutch size, date of clutch initiation, or clutch volume ($P>0.05$). CFR was negatively correlated with prey size ($P=0.0015$). While the analysis may be confounded by factors relating to age and past breeding history of the pairs, it appears (a) that CFRs of Common Terns decrease rapidly after clutch initiation and (b) that CFR may depend on prey size. Specific analyses relating CFR to the nutritional demands of egg-laying were not available. Therefore, relationships between CFR and prey type and size are unclear.

SIX THOUSAND YEAR HISTORY OF ANTARCTIC SHAGS IN TIERRA DEL FUEGO

Siegel-Causey, D. (Museum of Natural History, University of Kansas, Lawrence, KS 66045)

The Antarctic Shag (*Notocarbo bransfieldensis*) can be discriminated from its congeners by five osteological characters. Using these characters, I was able to identify bones of this species in five shell middens located in southern Fuego-Patagonia. The temporal distribution of these elements extend from historical times (280 ybp) to the middle Holocene (5960 ybp). These extra-limital birds may have reached Fuegian waters through chance events, by post-breeding dispersal, or as vagrants from a yet undiscovered colony in Tierra del Fuego. Possible support for the last hypothesis is given by the discovery of an adult Antarctic Shag collected in Ushuaia Bay during austral summer. I discuss the implication of these and other findings on the specific status of the Antarctic Shag and its sympatry with the Imperial Shag.

THE EFFECT OF PLASTIC INGESTION ON GROWTH AND SURVIVAL OF ALBATROSS CHICKS

Sievert, P. R., and L. Sileo (National Wildlife Health Research Center, U.S. Fish and Wildlife Service, 6006 Schroeder Road, Madison, WI 53711)

The effect of ingested plastic on the growth and survival of chicks of Laysan Albatrosses (*Diomedea immutabilis*) and Black-footed Albatrosses (*D. nigripes*) on Midway Atoll was studied during the nesting seasons of 1986 and 1987. The weight and proventricular content of the chicks was determined periodically through the nesting cycle. Large ($>22\text{cc}$) volumes of plastic were present in the proventriculi of 26.6% of the Laysan and 15.5% of the Black-footed chicks examined by endoscopy. Prior to fledging, albatross chicks regurgitated pellets composed of plastic and other indigestible material from their proventriculi. Laysan chicks with high ($>22\text{cc}$) amounts of proventricular plastic had asymptomatic fledging weights significantly lower (122g) than chicks with low amounts of plastic. Plastic had no detectable effect on the growth of Black-footed chicks. All chicks that died were examined by necropsy. Ingested plastic was the cause of death of one of 138 Laysan Albatross chicks.

BREEDING SUCCESS OF CASPIAN TERNS ON LAKE HURON AT A TIME OF HIGH CONTAMINANT LEVELS: A RETROSPECTIVE ANALYSIS

Snedden, W. A. (Department of Biological Sciences, Brock University, St. Catharines, Ontario, L2S 3A1, Canada), and D.V. Weseloh (Canadian Wildlife Service, Box 5050, Burlington, Ontario, L7R 4A6, Canada)

Aquatic contaminants had a major impact on the breeding success of several species of waterbirds nesting in the Canadian Great Lakes during the late 1960's and early 1970's. Double-crested Cormorants suffered almost total reproductive failure during this time whereas Caspian Terns nesting in close proximity appear to have been little affected. We examined the breeding success of Caspians nesting on South Limestone Island, Lake Huron, during 1972 in comparison with previous and subsequent studies, and contrast this to reproductive data on cormorants from the same time period. Fledgling success of Caspian Terns during 1972 was 1.13 young/pair; this compares favorably with other studies. DDE levels in Caspian and cormorant eggs were in the 12-15 ppm range during 1972. We suggest that any detrimental affects of aquatic toxins were not manifested in the breeding success of Caspian Terns during this period.

EUSTRONGYLIDOSIS IN WADING BIRDS AT THREE COLONY TYPES IN SOUTHERN FLORIDA

Spalding, M. G., and D. J. Forrester (Department of Infectious Diseases, University of Florida, Gainesville, FL 32601)

We investigated the infection of wading birds by the parasitic nematode, *Eustrengylides ignotus*, and compared the prevalence between different colony types in southern Florida. Higher prevalences of infection were found in nestlings in an estuarine coastal mangrove colony than in freshwater marsh (Everglades) colonies. A very low rate of infection was found at a saltwater island (Florida Bay) colony. The consequences of foraging site, prey items, and colony site, relative to infection by this parasite are discussed for the different species nesting in these colonies.

JUVENILE SURVIVAL AND NATAL VS. NON-NATAL COLONY SITE RECRUITMENT OF BREEDING ROSEATE TERNS AT FALKNER ISLAND, CONNECTICUT

Spedelow, J. A., and J. D. Nichols (U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708)

Capture-recapture methodologies can be modified to estimate survival rates of juveniles from post-fledging until first breeding. Through 1988, between 6 to 13% of the Roseate Tern (*Sterna dougallii*) fledglings banded annually from 1977-1984 on Falkner Island, Stewart B. McKinney National Wildlife Refuge, have been caught at least once as breeding adults at this same colony. While less than 2% of the chicks banded during this same period at other colony sites in Connecticut, New York, and Massachusetts have been trapped as breeding adults at Falkner Island, birds banded as chicks at other colony sites account for roughly one-third of the known-age recruits from these age classes. The implications of these results with respect to the amount of intercolony movement that may take place and the ability of this species to colonize new breeding sites will be discussed.

FORAGING HABITS OF BREEDING AND POST-BREEDING SNOWY EGRETS AND TRICOLORED HERONS

Strong, A. M., G. T. Bancroft, and S. D. Jewell (National Audubon Society, Tavernier, FL 33070)

We studied foraging habits of breeding and post-breeding Snowy Egrets (*Egretta thula*) and Tricolored Herons (*E. tricolor*) at the Rodgers River Bay Colony in west-central Everglades National Park from April through July, 1988. We compared habitat at foraging sites, distance to feeding sites, and size of feeding flock associations. Habitat use by breeding and post-breeding birds was similar between species; nearly 60% of the foraging locations for both species were in inland marsh and inland marsh-mangrove transitional zones. Post-breeding birds showed an increase in the use of short mangrove habitats. Breeding Tricolored Herons fed closer to the colony than did breeding Snowy Egrets. Post-breeding Tricolored Herons fed much farther from the colony than did breeding birds, but distance to feeding sites was similar for breeding and post-breeding Snowy Egrets. Nearly 75% of the Tricolored Herons fed singly or in pairs, whereas ~50% of the Snowy Egrets were found in flocks >50 birds.

POPULATION TREND OF NESTING GLAUCOUS-WINGED GULLS IN THE STRAIT OF GEORGIA

Vermeer, K. (Institute of Ocean Sciences, PO Box 6000, Sidney, British Columbia, V8L 4B2, Canada)

The nesting population of Glaucous-winged Gulls (*Larus glaucescens*) was censused in the Strait of Georgia in 1986, and the reproductive success of small and large colonies was investigated. In 1986, 13,000 nesting pairs were found. The gull population has doubled since 1960. Large colonies produced more fledglings (1.1 - 1.4 per nest) than did small colonies (0.3 per nest). The low reproductive success of small colonies has apparently been caused by predation. Bald Eagles (*Haliaeetus leucocephalus*), Northwestern Crows (*Corvus caurinus*) and River Otters (*Lutra canadensis*) were observed predators on gulls.

AGE SPECIFIC FORAGING DIFFERENCES IN WOOD STORKS

Walsh, J. M. (Department of Zoology, University of Georgia, Athens, GA 30666), and M. C. Coulter (Savannah River Ecology Laboratory, Aiken, SC 29802)

Foraging experience may contribute to increased foraging success with age in many species. Wood Storks (*Mycteria americana*) are primarily tactile feeders, and success with this specialized method of feeding may improve with age. Observations of foraging success may be important for determining the ability of different age classes to obtain food and understanding the importance of prey density on the foraging success of different age classes.

Wood Storks have three easily identifiable age classes: Hatching year, sub-adult, and adult. We collected data from both video-taped and direct observations. Prey density estimates were obtained using a throw trap.

Overall we found hatching year birds were less successful than older birds. Age specific differences in foraging behaviors such as wing flashing and foot stirring were also noted.

TIME CONSTRAINTS AND THE POTENTIAL EFFECTS OF RELOCATION ATTEMPTS ON PRODUCTIVITY IN YELLOW-CROWNED NIGHT-HERONS

Watts, B. D. (Department of Zoology, University of Georgia, Athens, GA 30602)

In Virginia, nearly 85.0% of the known Yellow-crowned Night-Herons nest in densely populated residential areas. Of the 163 residential pairs monitored in 1987, 87.8% nested on privately owned lots with occupied homes, 5.4% on privately owned vacant lots, and 7.8% on city owned parkland. Aside from the destruction of foraging habitat, the negative attitudes and disruptive actions of homeowners currently pose the greatest threat to this population. Attempts to harass or relocate pairs after nest site establishment delay nesting and ultimately shorten the breeding season. Parameters were derived from the analysis of ten years of breeding data and were used to construct a simulation model. This model was used to predict productivity under different time constraints. Simulation results were used to make recommendations concerning when relocation attempts would likely have the least impact on productivity.

SEVERITY OF BILL DEFORMITIES IN DOUBLE-CRESTED CORMORANTS FROM THE GREAT LAKES AND LAKE WINNIPEGOSIS, MANITOBA, CANADA

Weseloh, D. V. C., and Peter S. Ross (Canadian Wildlife Service, Box 5050, Burlington, Ontario L7R 4A6)

We examined between 1,300 and 11,500 young cormorants (*Phalacrocorax auritus*) on each of four Great Lakes and Lake Winnipegosis, Manitoba (total examined = 33,000+). From 0 - 26 birds with bill deformities were found on each lake (total birds with deformities = 47). The most common deformity was a rightward and downward deflection of the upper mandible. We used an Index of Morphological Response to measure the severity of each bill deformity. There was no difference between the mean index values of bill deformities for the U.S. vs Canadian sides of the Great Lakes. However, the mean index value for cormorant bill deformities on the Great Lakes (9.1) was significantly greater than that (5.0) found on Lake Winnipegosis. We are investigating the deformity question from a toxic chemical perspective.

STATUS OF THE LEAST TERN IN NEW MEXICO

Williams, S. O., III (Endangered Species Program, New Mexico Department of Game and Fish, State Capitol, Santa Fe, NM 87503)

The Least Tern (*Sterna antillarum*) was first documented in New Mexico in 1949, when it was found breeding at Bitter Lake NWR; since then it has been present there essentially annually. Population counts over the period have varied, ranging up to 60 birds in 1961, but more usually 20-30. Maxima during the period 1965-74 averaged 21.4 birds, but declined to 9.2 birds during 1975-84. In 1986, four pairs fledged a total of two young, while in 1987, three pairs fledged six young; in 1988, three pairs nested unsuccessfully. In 1986, the terns began nesting off the refuge on lands where management options are restricted. Active management, including habitat enhancement on refuge lands and banding for individual recognition, is recommended.

ALBATROSS BIOLOGY AND AN ORACLE DATABASE: WHAT RELATION?

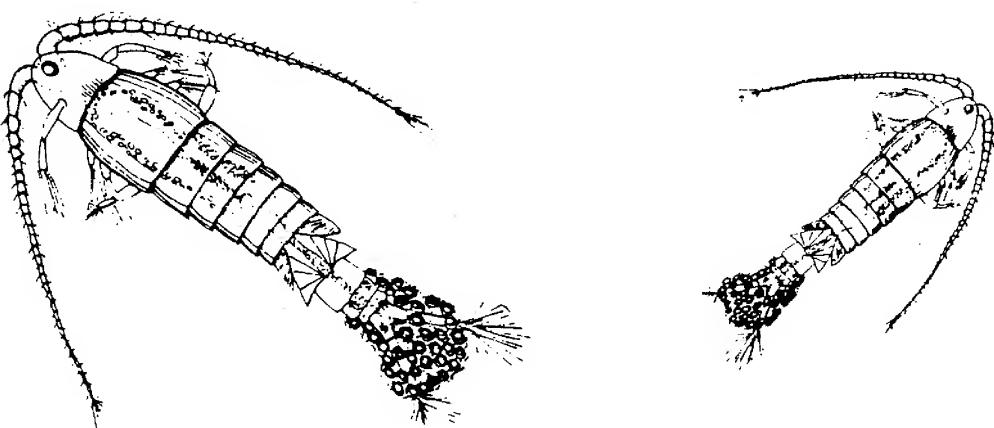
Wood, A. G. (British Antarctic Survey, High Cross, Madingley Road, Cambridge, CB3 OET, U.K.)

As part of long term monitoring projects at Bird Island in the South Atlantic, biologists at the British Antarctic Survey are studying relations between breeding success, periodicity and survivorship in Wandering (*Diomedea exulans*), Black-browed (*D. melanophris*) and Grey-headed (*D. chrysostoma*) albatrosses, using individually banded birds. This paper discusses aspects of a database that has been developed for these projects, using the relational database management system from ORACLE. The database incorporates all past banding, breeding, and biometrical information for these birds, and is implemented on a DEC VAX 8600 in the U.K. and a PC-AT in the South Atlantic. The mainframe system is used for data analysis, and is maintained as the definitive data set. The PC-ORACLE application at Bird Island incorporates all relevant data from the U.K. in a "forms" based data entry system for use by the biologists in the field. All new data can be validated, at the point of entry, against information already held.

SEASONAL VARIATION IN THE DEGREE OF INTRA-CLUTCH HATCHING SYNCHRONY OF THE RING-BILLED GULL (*LARUS DELAWARENSIS*)

Woulfe, M. A. (Department of Biological Sciences, Brock University, St. Catharines, Ontario, L2S 3A1, Canada)

Intra-clutch hatching intervals of Ring-billed Gulls lengthen as the breeding season progresses despite equal egg-laying intervals. This seasonal change toward hatching asynchrony is most widely viewed as an adaptation providing parents with the potential for brood reduction in response to adverse environmental conditions, unpredictable food supply, or breeding inexperience. The Brood Reduction Hypothesis leads to several predictions: 1) parents of peak clutches manipulated to hatch asynchronously should not experience decreased reproductive success relative to synchronously hatching peak control clutches in a year of normal food availability. 2) Peak nesting pairs are expected to achieve higher reproductive success than late nesting pairs. In 1986, the first prediction was realized while the second was not. Seasonal differences in the reproductive biology of the Ring-billed Gulls and the relationship of these differences to changes in the degree of hatching synchrony and reproductive success will be discussed.



REGIONAL REPORTS

BRITISH COLUMBIA/WASHINGTON STATE, KEEs VERMEER

Symposium on seabirds

A symposium is planned on the *Status, ecology, and conservation of marine birds of the temperate North Pacific*. The symposium will be held in Victoria, British Columbia on February 22-23, 1990, during the next annual PSG meeting. The symposium will consist of three sections:

1. Seabird distribution at sea
2. Status and ecology of nesting seabirds
3. Conservation and management of seabirds

The proceedings are planned to be published by the Canadian Wildlife Service.

Seabird studies in British Columbia

1. An inventory of seabirds has been completed for the whole coast of British Columbia - Mike Rodway, Moira Lemon, and Gary Kaiser
2. Predation of rats on Ancient Murrelets at Langara Island, Queen Charlotte Island - Doug Bertram
3. Evaluation of effects of Gray Harbor oil spill on seabirds along S.W. Vancouver Island - Alan Burger
4. Ecology of Rhinoceros Auklets - Anne Harfenist
5. Potential predation of raccoons on nesting seabirds in the Queen Charlotte Islands - Lisa Hartman
6. Continuation of population study of Ancient Murrelets on Reef Island - Tony Gaston
7. Completion of nesting and feeding study of Great Blue Herons on Sidney Island - Robert Butler
8. Initiation of studies on Glaucous-winged Gulls, Pelagic Cormorants and Black Oystercatchers at S.W. Vancouver Island - Kees Vermeer
9. Completion of a study on bird distribution in a S.W. Vancouver Island fjord - Kees Vermeer, and Ken Morgan

Seabird studies in Washington State, including research outside the region

1. Survey of marine birds and mammals along the Washington State coast - Mineral and Management Services
2. Testing radio tagging techniques on Marbled Murrelets - Dan Varoujean, Tracey Flemming, and Steve Speich
3. Continuation of surveys on Marbled Murrelets - Lora Leschner

4. Continuation of surveys on pelagic seabirds - Terry Wahl
5. Continuation of studies on Rhinoceros Auklets on Protection Island - Ulrich Wilson
6. Assessment of urban Canada goose problem - Dave Manuwal
7. Population dynamics of Magellanic Penguins, Argentina - six years of data; average fledgling success: 0.02-0.8 fledglings/pair/year - Dee Boersma
8. Long-term pair-bonding of Magellanic Penguins, Argentina - David Stokes

SOUTH AFRICA, JOHN COOPER

Research on the seabirds of southern Africa have been conducted at the Percy FitzPatrick Institute of African Ornithology, University of Cape Town (PFIAO) and many other organizations.

Many researchers have been examining Cape Gannets (*Sula capensis*). Nigel Adams and Rene Navarro (PFIAO) are studying aspects (radio tracking, growth rates) of these gannets. Berruti (now at the Durban Natural History Museum) received his PhD from the University of Natal for work on diets of the Cape Gannet in relation to fisheries. He carried out this work at the Sea Fisheries Research Institute in Cape Town. Graham Ross (Port Elizabeth Museum) is also working on gannets in Algoa Bay (demography, diets). Ken Nagy (PFIAO) is writing up results of doubly-labeled water experiments on gannets.

Research continues on Jackass Penguins (*Spheniscus demersus*) at the PFIAO. Rudi Laugksch is writing up his MSc entitled *Diet of Jackass Penguins, 1980-1988: an assessment of pelagic prey behavior*. Rory and Marie-Pierre Wilson (FRG) revisited the PFIAO in 1987 and tested various innovative gadgets on foraging Jackass Penguins: watch the literature.

Will Steele (PFIAO) is working on his PhD on aspects of the foraging behavior and diet of local *Larus* gulls. Sue Jackson (PFIAO) continues with her PhD research on seabird digestive physiology.

John Cooper (PFIAO) continues to write up data on southern African terns and cormorants, but now devotes most of his research time to sub-Antarctic seabirds.

Tony Williams (Cape Nature Conservation Department) continues island censuses. He is also working on the *Handbook of Afrotrropical Seabirds*, and writing world-wide reviews of seabird families, concentrating on distribution, population sizes and comparative biology.

SOUTHEAST, ROGER CLAPP

Natasha Atkins (Center for Marine Conservation) will be working with the EPA National Estuary Program to insure that protection and preservation of waterbird habitats is incorporated in their program for designating and managing estuaries of national significance. Delaware and Sarasota Bays are two recently designated estuaries on which she will be working. Persons with recent information and interest in the distribution and ecology of birds in these areas are asked to contact her at (202) 429 - 5609.

Ruth Beck (College of William and Mary) and her colleagues continue to conduct surveys of Virginia Waterbirds to detect changes in population sizes and sites. They are monitoring nesting success for selected species, primarily Least and Common Terns and Black Skimmers, and are investigating the effects of predation by native mammals and birds. They are also developing management methods to attract colonial waterbirds to areas where they may be protected.

Brian R. Chapman (Corpus Christi State University) is completing a six-year study of the White Pelican colonies in the Laguna Madre in Texas. He is also completing a paper with Jay W. Tunnel on the seabirds of the Compeche Bank that documents one of the world's largest colonies of Masked Boobies.

Roger Clapp (USFWS) is working up the results of sea and shorebird surveys of Kwajalein Atoll, Marshalls Islands, and Palmyra Atoll, Line Islands, as well as completing a number of distributional notes on Pacific birds.

Malcolm Coulter (Savannah River Ecology Laboratory, University of Georgia) continues long-term studies of Blue-footed Boobies in the Galapagos Islands. He is also conducting a large study of the foraging and breeding ecology of Wood Storks in east-central Georgia. He recently returned from China where he participated in a joint study with Anhui University on Oriental White Storks.

Tom Custer (USFWS) has been looking at egg-size in relation to laying order in Black-crowned Night Herons, Great and Snowy Egrets at a mixed heron colony in La Vaca Bay, Texas. He and his colleagues are also investigating methods of determining date of hatch from egg characteristics (i.e. flotation and/or specific gravity).

Michael Erwin (USFWS), together with Hans Blokpoel and Steve Lewis, is trying to get a Great Lakes Colonial Waterbird Survey initiated in 1989. The proposed study by both the USFWS and the Canadian Wildlife Service is in the planning stages.

Cameron and Kay Kepler (USFWS) visited Caroline Atoll in the central Pacific last fall where they found larger populations of Masked Boobies than hitherto recorded and noted the first instance of breeding by the Red-tailed Tropicbird. They visited all 39 islets comprising the atoll and are to present population estimates for the seabirds of each. Cam and Paul Sykes are also working on the semi-colonial, island wintering, Kirtland's Warbler.

Kirk King (USFWS) is completing studies on the effects of heavy metals on colonial waterbirds of La Vaca Bay, Texas, and is initiating a study of the effects on waterbirds of pollutants in oil-field waste water discharges onto mudflats. The primary species involved are wintering shorebirds.

David Lee (North Carolina State Museum) is working on a Navy contract on the possible effects of electromagnetic impulses on seabirds. He is also working up the results of over 13 years of seabird studies off North Carolina. Most of the results will appear in a USFWS publication but information on selected species, ingested plastic and mercury loads is being written for journal publication. The North Carolina Museum is actively working on extending its seabird collection that now contains good local series as well as a surprisingly large representation of species from other areas.

Jim Parnell (University of North Carolina, Wilmington) and David Lee are completing a manuscript that discusses a number of colonial waterbirds as part of a larger review of the rare and endangered birds of North Carolina.

Rich Paul (National Audubon Society) continues to manage the Tampa Bay Sanctuaries and in cooperation with other agencies oversees 29 species of colonial waterbirds.

Bill and Betty Robertson (Everglades National Park) are continuing their long-term studies on Sooty Terns at Bush Key. Their work is concentrating on reproduction and behavior of a population of about 400 individually color-marked birds. Bill mentioned that on 1 January, 1989, Hospital Key had five pairs of nesting Masked Boobies, the largest nesting concentration yet recorded in the continental United States.

Jim Rodgers (Florida Game and Freshwater Fish Commission) is working on two projects involving colonial waterbirds. One is a study of the effects of pesticides on a variety of species and the other is a study of the effects of human disturbance on a variety of both long-legged and short-legged waders. The latter study entails not only breeding sites but also areas in which the birds concentrate at other times of year. One of the outcomes of the study will be species-specific recommendations for the size of buffer zones needed to protect the birds in a variety of situations.

Fred Sladen (Virgin Islands Natural Heritage Trust) has been surveying the birds of St. Croix over the last several years and has produced a checklist of the birds of that island.

Jeff Spedelow (USFWS) continues his studies on population dynamics and habitat use by Roseate Terns at colonies in the northeastern United States. In 1989, he plans to extend the study to include experimental investigation of the value of nest-boxes in different habitats.

SOUTHERN CALIFORNIA, BETH FLINT

California State University, Fullerton

Bayard Brattstrom is summarizing 34 years of data on seabirds, terrestrial birds, and reptiles from the Islas Revillagigedo, Mexico, into three major papers. One on the biogeography of the islands will soon be published in the *Journal of Biogeography*. Data on food webs and feeding strategies of birds form the basis of another paper soon to be submitted. Results of seabird repopulation of San Benedicto Island, following the 1952

volcanic eruption which killed about 20,000 seabirds in 20 minutes, are being summarized in a third manuscript. Dr. Brattstrom is interested in accompanying anyone traveling to these islands.

California State University, Long Beach

Charlie Collins continues his work on the California Least Tern, including a long-term study of growth and a study of Least Tern adult survival at Camp Pendleton (in its third year).

Bill Schew is continuing his investigations into ecological determinants of growth in tern chicks. He welcomes any information or data concerning tern growth. He is also working with Charlie Collins on expanding populations of Elegant Terns and Black Skimmers.

Barbara Massey continues her long-term research on the California Least Tern, recently completing a 6th season of data collection at the colony in Venice, California. She is observing banded adults in order to study the age profile of the colony. Barbara is also working with Pat Baird on the adult survival study at Camp Pendleton. She is co-chair with Dr. Silvia Ibarra of the recently formed *Pro Esteros* (see PSG Bulletin 15,2), an organization devoted to preserving the integrity of the coastal marshes of Baja California, Mexico.

Pat Herron Baird is working on the study of adult survival of California Least Terns at Camp Pendleton with Charlie Collins and Barbara Massey.

Hubbs Sea World Research Institute

Joe Jehl is continuing his long-term studies of California Gulls, Wilsons's Phalaropes, and Eared Grebes at Mono Lake, California.

Los Angeles County Museum of Natural History

Betty Anne Schreiber continues her research on the breeding biology and ecology of pelecaniformes on Christmas Island (C.P.O.) and Johnston Atoll. She is also busy supervising the constructions and display design of the new Bird Hall at the museum.

San Diego Natural History Museum

William T. Everett is beginning a long-term research on the breeding seabirds of Islas Los Coronados, Baja California, Mexico in cooperation with several Mexican and U.S. scientists. He is planning a survey of the west coast of Baja California in 1990 to determine the breeding status of the California Least Tern and other seabirds there. He is also continuing his work on Clarion Island removing introduced pigs.

Southwest Fisheries Center, National Marine Fisheries Service

Bob Pitman and Steve Reilly, in collaboration with Lisa Ballance of UCLA, are studying flock composition and distribution of seabirds that forage over tuna-dolphin schools in the eastern tropical Pacific.

University of California, Irvine

Zoe Eppley continues her research on ecological and phylogenetic variation in the development of Charadriiform birds. She is currently doing field work at Palmer Station, Antarctica, on behavioral and developmental adaptations to cold in Kelp Gulls and skuas.

Margaret Rubega is now working at Palmer Station with Zoe Eppley. Upon her return in March she will be initiating a study of feeding behavior and morphology of Wilson's Phalaropes at Mono Lake.

George Hunt and Beth Flint with assistance from Ken Coyle (University of Alaska), Ted Cooney, Mary Beth Decker, Michele Miller, Kevin Richter, Margaret Rubega, and Ron Squibb (Utah State University) continue their project studying the effects of colony size on reproductive performance of seabirds breeding in the Pribilof Islands, Alaska. They are studying prey abundance, foraging distribution, and the energetics of Black-legged Kittiwakes, Red-legged Kittiwakes, and Thick-billed Murres. They were joined in the field this year by Dave Cairns (Department of Fisheries and Oceans, New Brunswick). Fridtjof Mehlum and Geir Gabrielsen of the Norwegian Polar Research Institute contributed their expertise and measured resting metabolic rates of six seabird species nesting in the islands.

Dick Veit with Dennis Heinemann and Mike Paine of the Manomet Bird Observatory will be studying the relationship between spatial distributions of krill and seabirds in Drake Passage and Bransfield Strait aboard the NOAA ship Surveyor in February. Dick Veit, in collaboration with John McGowan (Scripps Institute of Oceanography), is continuing to record spatial dispersion of seabirds in the California Current as part of the CALCOFI program.

As part of his PhD work at U.C. Irvine, Dave Irons is working in Prince William Sound studying how foraging behavior of individual Black-legged Kittiwakes affects their reproductive success. David is also monitoring kittiwake populations in Prince William Sound for the U.S. Fish and Wildlife Service in Anchorage, Alaska.

University of California, Los Angeles

Bernice Wenzel, in collaboration with John Matochik and Carolyn Reems, has almost completed a brain atlas of the Northern Fulmar. Her work with Esmail Meisami continues on the quantitative neuroanatomy of Northern Fulmar chicks and adults. Progress is slow, however, because of difficulty in obtaining suitable nesting material.

Bryan Obst continues his research concerning the energetics and digestive physiology of seabirds in Antarctica, Baja California, Northern Chile, and at Mono Lake.

Terry Bucher is working on data gathered last season at Palmer Station with Mark Chappell (U. C., Riverside) and Ken Morgan (University of Washington). They are studying metabolism and respiration in adults and chicks of Adelie Penguins, Blue-eyed Shags, Giant Petrels, Kelp Gulls, Skuas, and Wilson's Storm-Petrels.

Lisa Ballance is currently studying seabirds that forage in flocks above tuna-dolphin schools in the eastern tropical Pacific. She is interested in flock composition and distribution, and in the energetics of flight of some of the flocking species. This work is part of her PhD dissertation research at UCLA and involves collaboration with Steve Reilly and Robert Pitman of the National Marine Fisheries Service.

Pat Mock continues his study of the energetics of growth in Thick-billed Murres in collaboration with Beth Flint and George Hunt at UCI

University of California, Riverside

Robert McKernan is currently studying the wintering ecology of the Eared Grebes at the Salton Sea with Joe Jehl and Michael McCrary. He is also working on aspects of the ecology, management, and conservation of Pelecaniformes and Charadriiformes at the Salton Sea including a study of the food habits of the American White Pelican there.

University of California, San Diego - Scripps Institute of Oceanography

Gerald Kooyman has recently finished a project on the Emperor Penguin in the McMurdo Sound area and is now working with the French Antarctic Research Program on King Penguins at Crozet Island.

Don Croll is studying the diving behavior and energetics of Thick-billed Murres on Coasts Island, Hudson Bay, Canada. He is measuring dive profiles using a microprocessor-controlled recorder. He is measuring rates of energy expenditure in the field using the doubly-labeled water method. In the laboratory he is studying metabolic rates during diving, surface swimming, resting in air, and resting in water.

University of San Diego

Hugh Ellis is currently studying the energetics of locomotion and total energy budgets of Eared Grebes. In collaboration with Joe Jehl he is measuring total body water in Wilson's Phalaropes.



REPORT FROM THE MARBLED MURRELET TECHNICAL COMMITTEE

WORKSHOP

More than 60 researchers, agency personnel, and others attended various sessions of the workshop on research and management of Marbled Murrelets. During the course of reports from Alaska, British Columbia, Washington, Oregon, and California, several points became clear.

Present population status. The population of Marbled Murrelets, while high in Alaska and probably high in British Columbia, is quite low south of Puget Sound, and apparently has declined markedly over the past 50 to 100 years. The survey conducted in California in 1988 showed two population centers: one in Humboldt and Del Norte counties, and the other in San Mateo and Santa Cruz counties. A 300 mile gap exists between these populations where old-growth forests have been virtually eliminated. Most of the population in California is contained in state and national parks. However, researchers did locate a few small populations on private timber lands. North of these areas, current information strongly suggests that populations are scattered in low numbers, quite probably due to the highly fragmented nature of coastal old-growth forests between the California border and Canada.

Suitable habitat. Current research indicates that the species is exclusively associated with mature and old-growth forests within 30 miles of the coast. This corresponds to observations made over the past few years in California and Oregon that Marbled Murrelets occur primarily offshore of old-growth forests. The acreage required for nesting is not known. Site characteristics such as aspect, slope, and possible travel corridors are unknown.

Indicator species. There is no information that the indicator species concept applies to this unique seabird. All of the requirements of the Marbled Murrelet cannot be met in the forest as it must return to the sea. Thus, they cannot be an indicator species by definition, and they may not be protected like species whose needs are satisfied by the indicator species concept. The Marbled Murrelet may be similar to other alcids and thus traditional in nest site location. It may be difficult for the species to relocate in remaining suitable habitat, especially if the remaining habitat is even farther from saltwater. Land management agencies should include the Marbled Murrelet in the assessment of projects in coastal forests.

Status. All available information indicates a species in low and declining numbers. The National Audubon Society has petitioned USFWS to list the Washington, Oregon, and California sub-populations as endangered. The U. S. Forest Service and other land management agencies should consider the species as sensitive and forest planning efforts should address the nesting habitat requirements. The principal factors affecting population abundance may be under the control of land management agencies.

LETTERS

Letters were drafted on Marbled Murrelet issues. Mike Fry sent a letter to the U. S. Fish and Wildlife Service regarding the listing of the Washington, Oregon, and California subpopulations. A letter was also sent to

the Tongass National Forest suggesting that the Marbled Murrelet should be one of their indicator species and should be incorporated in their planning efforts.

Mike sent a letter to Minerals Management Service (MMS) suggesting that their 1990 study plan should be modified to include Marbled Murrelets. MMS did modify their plan and contributed money to C. J. Ralph's at-sea surveys in Northern California.

A letter to the Forest Service and other land management agencies has been drafted and sent to PSG members for review. The letter asks to defer action on activities that may impact suitable habitat and to implement a survey of breeding populations. A second letter will be sent to Wildlife agencies encouraging them to implement surveys and fund research.

REGIONAL REPORTS

California

C. J. Ralph is directing a study by Mineral Management Services, Redwood National Park, California Fish and Game, and the Forest Service. In-stand inventories will be conducted to compare stands where there are greater numbers of Marbled Murrelets versus moderate numbers.

Harry Carter will be censusing Marbled Murrelets at-sea to determine population size and the foraging areas of Marbled Murrelets.

A third part of the study will be the attempt to capture Marbled Murrelets with mist nets and then attach radio transmitters. Transmitters will be attached to any nestlings that are found so that at-sea habits can be studied.

Oregon

Kim Nelson, Oregon State University, is directing a complete survey of the Oregon coast range. The survey is funded by BLM, U. S. Forest Service, Oregon Department of Fish and Wildlife, National Council of Air and Stream Improvement, and National Fish and Wildlife Foundation.

The survey will be the road transect method as described in the PSG Marbled Murrelet manual by Ralph Paton, Harry Carter, and Kim Nelson. Information on habitat association of Marbled Murrelets will be collected. The survey may extend into southern Washington if there is insufficient habitat in Northern Oregon.

Washington

Tracy Fleming and Steve Speich (NCASI), and Dan Varoujean (MARZET) plan to refine and test radio tagging techniques on the Marbled Murrelet.

The Washington Department of Wildlife and volunteers will survey selected forest areas for the presence/absence of Marbled Murrelets. An attempt will be made to find additional Marbled Murrelet locations in areas

where groves have already been found. Only a small effort is planned because no funds are available. The Regional Office of the Forest Service plans to fund surveys in Washington in 1990.

British Columbia

Gary Kaiser (Canadian Wildlife Service) is planning a pilot survey of Marbled Murrelets as described in the PSG Manual. He also plans to study daily activity patterns on the water in undisturbed areas.

Alaska

Kathy Kulletz's final report on the evaluation of censusing techniques of Marbled Murrelets in Kachemak Bay, Alaska, has been completed. The U. S. Fish and Wildlife Service plans to continue the surveys in the 1989 field season.

Kathy saw Marbled Murrelets with fish in their bills fly into forested areas. They hope to search these groves and look for nest sites.

If funds are available, the U. S. Fish and Wildlife Service will survey at-sea Marbled Murrelet populations around Afognak Island near Kodiak. Landowners are harvesting the old-growth on this island.

Lora Leschner
Chair, PSG Marbled Murrelet Technical Committee

RESEARCH PRIORITIES FOR 1989

The following priorities were developed during the Marbled Murrelet workshop in September, 1988.

Research Priorities

A. Identify areas of activity. Through the use of forest inventory techniques, identify and quantify areas of Marbled Murrelet activity in the coastal areas of Oregon and Washington, selected areas of British Columbia and Alaska, and areas of California not yet thoroughly surveyed. Determine, as best as possible, the relationships between Marbled Murrelet activities and forest characteristics. For compatibility, surveys should use techniques established during the 1988 field season.

B. Intensive inventory and behavior observations. Return to the areas identified in California and Oregon in 1988 having Marbled Murrelet activity, focus efforts to locate and identify forested areas, by methods now being established, to determine the relationships between areas utilized by Marbled Murrelets and forest characteristics. Quantify the behavior of Marbled Murrelets in these areas and determine the relationships between behavior and identified or likely nesting areas, and use the knowledge to interpret and understand the data derived from the more general and broad scale forest inventory results of 1988 and 1989. There are a small number of identified areas in Washington where these procedures can also be applied.

C. Find nests. Find and quantify as many nests, nest substrates, and surrounding habitats as possible, in forests throughout Marbled Murrelet range from California to Alaska. Observe and quantify the behavior of Marbled Murrelets at individual nests, and utilize this knowledge to interpret and understand information generated from other activities (i.e. A and B, above).

D. Population size. Conduct marine censuses of the coastal waters of California, Oregon, Washington, British Columbia, and selected areas of Alaska, to determine the relative numbers of Marbled Murrelets in specific regions, during the reproductive period.

E. Genetic variability. Collect blood samples from all birds caught during 1989 from areas throughout the Marbled Murrelet breeding range to investigate, through analysis of nuclear DNA, the genetic variation between, and possible genetic isolation of, Marbled Murrelet populations.

Refinement of Methodologies

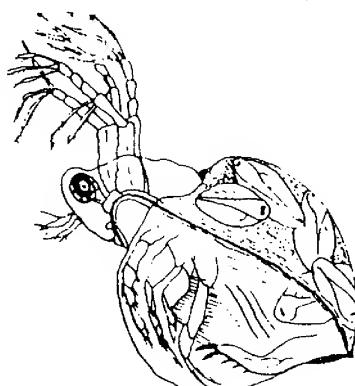
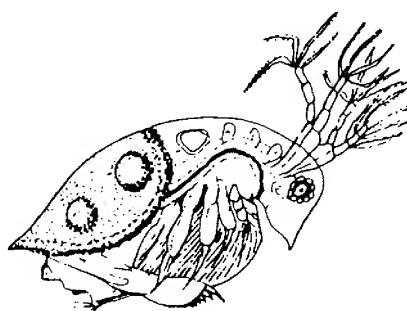
The application of methods used to study Marbled Murrelets during the 1988 field season revealed areas that need refinement and further development before their use in the 1989 field season. These include forest inventory methods, quantification of nest sites and forest habitat, recording and quantification of behavior observations at nests and during inventories, technical aspects of radios and their attachment to Marbled Murrelets, and methods of capture. Individual researchers are now in the process of working on these concerns. Protocols relating to these topics are being prepared and will become available as techniques and methodologies are refined.

There is general consensus that we need to continue to develop and perfect the technical aspects and methods to capture and place radios on Marbled Murrelets specifically to locate nest sites, and to improve access to Marbled Murrelet behavior. This effort should proceed concurrently with the other research activities outlined above.

Lora Leschner
Chair, PSG Marbled Murrelet Technical Committee

and,

Steve Speich
Research Guidelines Coordinator



WORKSHOP ON RESEARCH AND MANAGEMENT OF MARBLED MURRELETS
Portland, Oregon
27-28 September, 1988
Lora Leschner

The Pacific Seabird Group hosted a workshop on Marbled Murrelets in September, 1988. Dave Marshall was the arrangements chair and Lora Leschner organized the paper and workshop sessions. Thirteen papers were presented.

More than 60 people from Alaska, British Columbia, Washington, Oregon and California attended the two day meeting. The organizations represented and numbers of representatives in parentheses were: USFWS (8), USFS (13), BLM (1), Universities (5), State Wildlife agencies (9), Aquaria (3), Audubon Societies (3), Other (13), Unknown (7).

There was a workshop session to refine research objectives and discuss management activities. Susan Saul, U.S. Fish and Wildlife Service, facilitated this workshop. The intent was to provide a forum for biologists from various organizations to exchange ideas on research and management strategies. It was particularly important that biologists from the Forest Service participate in the discussions. Their insights into land management activities helped clarify some of the necessary actions.

The workshop began with a general discussion of options. Many research and management actions were suggested. The participants then divided into two discussion groups.

One group concentrated on setting priorities for research. Steve Speich led the discussion. They used the Marbled Murrelet research guidelines developed by Steve as a discussion outline. The result was a list of research priorities for 1989. That list is included in the previous section of this bulletin.

The other group discussed the management actions that had been suggested in the earlier discussions. Activities were divided into those that PSG should pursue and those that should be recommended to land managers. Three priorities were selected: 1) land managers should defer timber harvest in suspected nesting areas and conduct pre-sale inventories in potential habitat; 2) increase public and agency awareness; and 3) inform permitting agencies of important marbled Murrelet foraging areas.

It was agreed that another letter should be sent to land management agencies. It was also suggested that a Marbled Murrelet poster would be a good educational tool. It could be given to agencies, conservation groups and schools.

ABSTRACTS

MARBLED MURRELET (*BRACHYRAMPHUS MARMORATUS*) ACTIVITY PATTERNS ON LONG ISLAND, WASHINGTON

Atkinson, K. B. (Willapa National Wildlife Refuge, HC 01 Box 910, Ilwaco, WA 98624), and S. W. Manlow (Grays Harbor County Planning and Building Department, P. O. Box 390, Montesano, WA 98563)

We monitored an old-growth western red cedar/western hemlock stand on Long Island in southwestern Washington for potential utilization by Marbled Murrelets (*Brachyramphus marmoratus*) in 1988. Evidence accumulated as a result, identifies this stand as a very likely nesting grove. Consistent activity patterns combined with an array of aerial and vocal displays tend to support such an association. Activity periods were monitored at opportunity, primarily from two fixed points on the island. Periods of morning activity were noted from 12 April to 4 August with a peak occurring in mid- to late July. Evening activity was recorded on four occasions from 24 June to 7 July. Murrelet vocalizations were tape recorded at opportunity during several morning activity periods in July. Visual observations of flying murrelets were recorded on occasion from the top of a dominant tree. Murrelets were observed diving below the horizon and apparently into the forest on several occasions but could not be associated with a particular tree or group of trees. Murrelet activity sharply declined during the first week of August and entirely so by 9 August.

A METHOD TO ATTACH RADIO TRANSMITTERS TO MARBLED MURRELETS

Fleming, T. L. (7701 Zangle Road N.E., Olympia, WA 98506), S. M. Speich (4817 Sucia Drive, Ferndale, WA 98248), and L. L. Leschner (Washington Department of Wildlife, 7801 Phillips Road SW, Tacoma, WA 98498)

A method to attach radio transmitters to Marbled Murrelets is described in detail. A mock-up transmitter was attached to a captive Marbled Murrelet and the bird was then observed for two months. No adverse affects were noted and the mock-up transmitter stayed firmly attached the entire period. At the end of the experiment the transmitter had to be cut off. This technique is compared with that used to attach radio transmitters to Rhinoceros Auklets in Washington, and to similar attachment techniques used on other waterbirds elsewhere. Attachment material are displayed.

RELATIVE DISTRIBUTION OF MARBLED AND KITTLITZ'S MURRELETS IN KACHEMAK BAY, ALASKA

Kuletz, K. (Alaska Maritime National Wildlife Refuge, 202 Pioneer, Homer, AK 99630)

In Alaska, identifying critical habitat for Marbled Murrelets (*Brachyramphus marmoratus*) (MAMU) is complicated by the potential for overlapping requirements and behavior of its congeneric, the Kittlitz's Murrelet (*B. brevirostris*) (KIMU). Both species occupy Kachemak Bay, in southcentral Alaska, during the breeding season. In summer 1988, I tracked the distribution of MAMU and KIMU within the bay. Straight line transects with a 25-foot whaler between 0600-1000 h were used, and repeated in high-use

areas, throughout the season (24 days). In the south outer bay (characterized by channels and fjords), MAMU comprised 96-100% of identified murrelets ($\bar{x} = 19.7 \pm 10.8$ s.d. birds/km²), until late July. In the south inner bay (with coves, lagoons and glacial spits), KIMU numbers increased, comprising up to 92% of identified murrelets near areas of glacial runoff. The south inner bay had mean densities of 33.7 KIMU and 19.5 MAMU/km², but relative and total densities varied widely among transects. The relationships between their relative densities on the water and surrounding terrestrial and marine habitat will be discussed.

VARIABILITY IN REPEAT CENSUSING OF MARBLED MURRELETS IN KACHEMAK BAY, ALASKA, SUMMER 1988

Kuletz, K. (Alaska National Wildlife Refuge, 202 Pioneer, Homer, AK 99630), V. Mendenhall (U. S. Fish and Wildlife Service, 1011 East Tudor Road, Anchorage, AK 99509), and M. Nishimoto (Alaska National Wildlife Refuge, 202 Pioneer, Homer, AK 99630)

The AMNWR studied variability in census results (straight line transects), for Marbled Murrelets (*Brachyramphus marmoratus*) (MAMU) in Kachemak Bay, Alaska from mid-May to early August, 1988. We also analyzed variability among repeat transects conducted on adjoining days. Five transects totaling 17 linear km were censused one or two times a week ($n = 19$) with a 25-foot whaler between 0600 and 0930 h. MAMU densities were higher in May ($\bar{x} = 17 \pm 9$ s.d. birds/km²) and July ($\bar{x} = 24 \pm 14$ s.d. birds/km²), but less variable in June ($\bar{x} = 15 \pm 3$ s.d. birds/km²), the estimated nestling stage. From mid-July to early August, density increased significantly with date, reaching a peak of 46 birds per km² on 29 July, with a heavy-use transect high of 101 birds/km². This suggests that late-season counts included juveniles and adults from outside the immediate area. In addition, Kittlitz's Murrelets (*B. brevirostris*) (KIMU) increased after mid-July (probably from inner Kachemak Bay), accounting for up to 18% of all murrelets by 4 August. In Alaska, KIMU movements in late season may compound census attempts of MAMU.

DEVELOPMENT OF INVENTORY TECHNIQUES FOR SURVEYING MARBLED MURRELETS (*BRACHYRAMPHUS MARMORATUS*) IN CONIFEROUS FORESTS OF THE OREGON COAST RANGE

Nelson, S. K. (Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis, OR 97331)

Systematic inventory techniques were tested to develop the most effective and efficient method for locating, documenting and describing use of inland coniferous forests by Marbled Murrelets. Censuses occurred in six inland study sites, and involved 1) testing response rates of murrelets to tape recordings of their vocalizations and 2) quantifying detection rates without the use of recordings. These methods were tested at two fixed census stations at each site during dawn and dusk surveys. Marbled Murrelets were detected most frequently at dawn and more visual observations obtained from road or vantage point census stations. These alcids did not respond to tape recordings of their vocalizations. Murrelet flight patterns in the six study sites and along river corridors were monitored; they displayed a variety of intricate circular flights and demonstrated high variability in flight paths

to inland use areas. In addition to these inventory techniques, 20 new inland Marbled Murrelet use areas were discovered along random road transects in the central Oregon Coast Range. Habitat associations with these new use areas will be discussed.

THE CARE AND FEEDING OF MARBLED MURRELETS IN CAPTIVITY

Nelson, K., and B. Bouma (Seattle Aquarium, Pier 59, Waterfront Park, Seattle, WA 98101)

Two Marbled Murrelets were maintained at the Seattle Aquarium for three months. Problems encountered in the care and feeding of these birds are described. Recommendations for future captive management programs are made.

A CENSUS METHOD FOR MARBLED MURRELETS AT INLAND SITES

Paton, P. W. C., and C. J. Ralph (Redwood Sciences Laboratory, U. S. Forest Service, 1700 Bayview Drive, Arcata, CA 95521)

We developed a survey method to determine Marbled Murrelet use of inland sites. Censuses were conducted at fixed stations, listening and looking for murrelets for 10 min per station. Stations were spaced from 250 m to 1 km apart based on topography. Censuses were initiated 45 min before official sunrise and stopped 75 min after sunrise. The effectiveness of this method in determining murrelet presence and use patterns of stands will be discussed.

GEOGRAPHICAL DISTRIBUTION AND HABITAT ASSOCIATION OF THE MARBLED MURRELET IN THE FORESTS OF THE REDWOOD REGION OF CALIFORNIA AND SOUTHERN OREGON DURING 1988

Ralph, C. J., P. W. C. Paton (Redwood Sciences Laboratory, U. S. Forest Service, 1700 Bayview Drive, Arcata, CA 95521), and G. Strachen (Año Nuevo State Reserve, Pescadero, CA 94060)

We developed and implemented a survey from Monterey County to southern Oregon. Our objective was to determine its geographical distribution and abundance. It apparently nests primarily within 20 km of the coast. Two major population centers were found: one in Santa Cruz and San Mateo Counties, in state park lands; and the other largely within the boundaries of the redwood parks in Del Norte and Humboldt Counties. We also found several small populations on private, as well as other state and federal lands. We detected very few birds over the probably former range between southern Humboldt County and San Francisco. Future research and management goals will be outlined.

During a survey of this species in forests from Monterey County into southern Oregon, we determined its geographical habitat association patterns. It apparently nests in older trees, as most birds were in or near older forests, but some areas of old growth forests lacked the species. In the northern part of the area surveyed, there appeared to be a stronger association with older trees than farther south.

CATCHING MARBLED MURRELETS: A MARINE "ROADRUNNER" SHOW

Speich, S. M. (4817 Sucia Drive, Ferndale, WA 98248), T. L. Fleming (7701 Zangle Road N.E., Olympia, WA 98506), L. L. Leschner (Washington Department of Wildlife, 7801 Phillips Road SW, Tacoma, WA 98498), and B. L. Troutman (Washington Department of Wildlife, 7512 Mirimichi Drive NW # 2, Olympia, WA 98502)

Two Marbled Murrelets were captured during the summer of 1988 on Puget Sound, Washington, using a "Coda" net-gun. After several trips and many near captures, including birds escaping from capture nets, specific approach techniques and equipment needs were developed. Early in the summer pairs of Marbled Murrelets are "split", using one or tow boats, and then one bird of the pair is repeatedly approached between dives until it flies. Later in the season small groups of murrelets are repeatedly approached between dives until one or more birds fly. If the flushed bird is within range, the net gun is fires within seconds after the bird takes flight. More opportunities to catch birds occur on days with a light wind and chop on the water, as birds then take off into the wind and rise higher above the water before gaining flight speed. Although several attempts were made, we were unable to chase down birds in a high speed boat. Details of the net-gun, nets, floats, projectiles, etc. are presented.

WINTER DISTRIBUTION AND POPULATION STATUS OF THE MARBLED MURRELET

Trapp, J. L. (U. S. Fish and Wildlife Service, Office of Migratory Bird Management, Washington, D. C. 20240)

Marbled Murrelets were recorded at 78 (76%) of 103 coastal sites at which Christmas Bird Counts (CBC) were conducted, 1970-86. Marbled Murrelets are widely distributed in winter, but highly clumped within especially favorable habitats. For example, in an average year, 67% of the birds were concentrated in 7 (14%) of the 51 latilong blocks in which CBC's were conducted. There were strikingly similar patterns in Marbled Murrelet trends from Alaska, British Columbia, and Washington. After exceeding expected values in the mid- to late 1970's, the index dropped steeply in the late 1970's and early 1980's before leveling off about 15 to 20% below expected values. By contrast, the number of Marbled Murrelets detected in Oregon and California increased greatly beginning in the early 1980's and mid-1970's, respectively. Possible reasons for these trends will be discussed.

INLAND DISTRIBUTION OF MARBLED MURRELETS IN WASHINGTON STATE, 1988

Troutman, B. L., and E. B. Cummins (Washington Department of Wildlife, 600 North Capitol Way, Olympia, WA 98504)

Extensive surveys were conducted during the 1988 breeding season to discover inland areas used by Marbled Murrelets, to attempt to identify possible nesting stands, and to evaluate ground survey methods. Volunteers were responsible for most of the survey effort and their participation permitted the broad geographical coverage accomplished during the study. Methods included monitoring of potential nest stands using a transect design established by Paton et al. and establishing fixed-point survey stations along potential inland flight corridors. During the course of the study murrelets were detected at more than 18 inland locations including three out

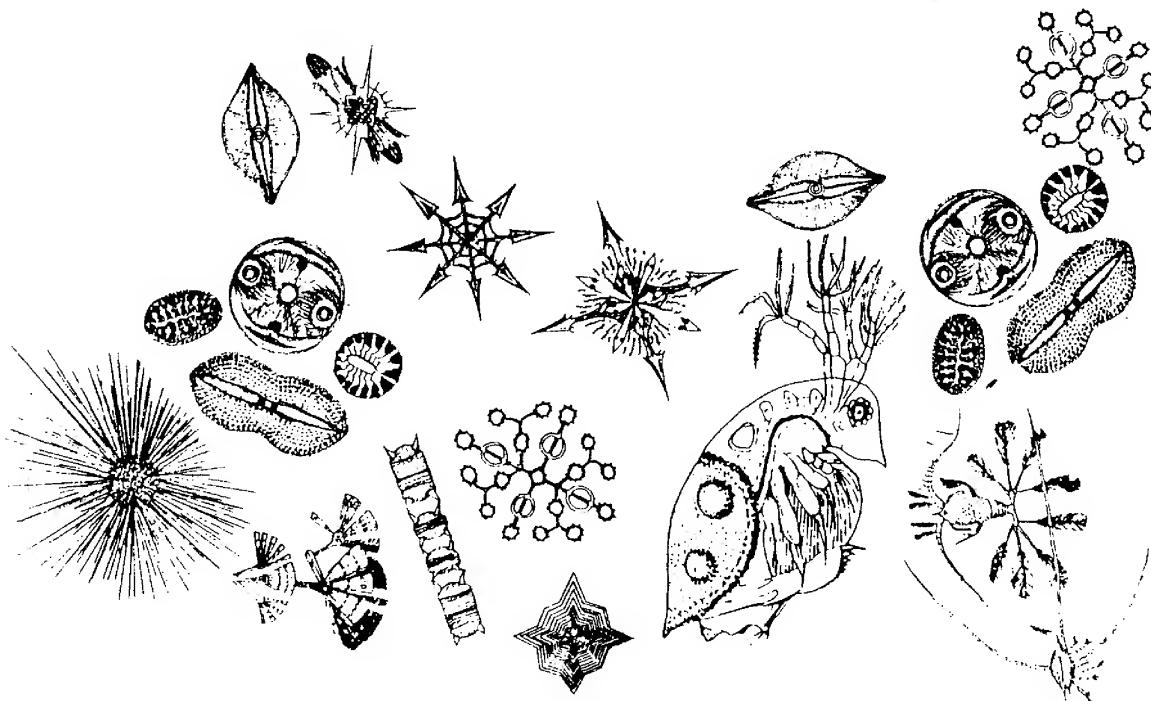
of the four sites where murrelet chicks or fledglings were found prior to 1988. Most detections resulted from fixed-point surveys which proved to be the most efficient method for preliminary identification of murrelet use areas in a survey encompassing broad geographical area. While only a few probable nest stands were discovered, a number of flight corridors were identified along river drainages, thus laying the groundwork for future efforts to track down specific nest stands.

FINDINGS AND EFFICACY IN EMPLOYING RADIOTELEMETRY TO LOCATE THE NESTS OF MARBLED MURRELETS

Varoujean, D. H., W. A. Williams, and D. R. Warrick (MARZET, Marine and Estuarine Research Company, 2269 Broadway, North Bend, OR 97459)

The third year of equipping Marbled Murrelets (*Brachyramphus marmoratus*) captured at sea off the Oregon coast with radio transmitters resulted in the location of a tagged bird at an island site, a small basin (0.3 km^2) located on the north shore of the Umpqua River approximately 22 km from the coast. Before the signal was lost 24 days after deployment, we were able to gather enough information on activity patterns to surmise that the radio-tagged bird was incubating an egg at a nest site. But, due to extreme signal bounce in this steeply sloped basin, we were unable to locate the nest tree or nest before the signal was lost. Subsequent land-based surveys revealed that an estimated six pairs of murrelets were frequenting this basin.

We present a review of our findings, including data pertaining to movements and activity patterns of radio-tagged Marbled Murrelets, and proffer an opinion as to the efficacy of using radiotelemetry to find Marbled Murrelet nests, given the necessary levels of commitment of equipment and personnel, and the present method for scheduling and financing this research.



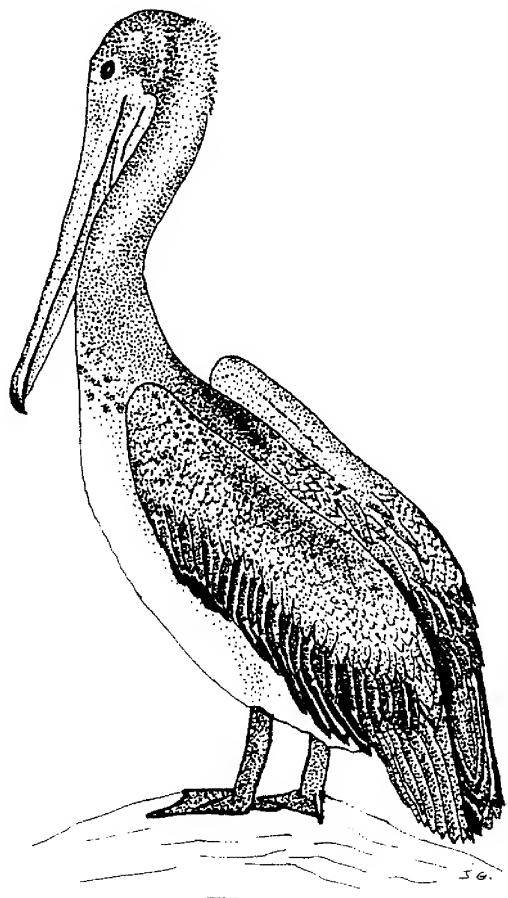
SEABIRD NEWS

GRUPO IBERICO DE AVES MARINAS

The Iberian Seabird Group, formed under the auspices of the Spanish Ornithological Society, was formed to promote the study and conservation of seabirds within the area formed by the Iberian Peninsula, and the islands of Balearics and Macaronesia (Canaries, Madeira and Azores). In 1988 the group started to publish a quarterly bulletin which includes information on seabirds within the region as well as international seabird news, and book reviews. The annual subscription is 500 pesetas. Subscriptions and information requests should be sent to: Grupo Iberico de Aves Marinas de la Sociedad Española de Ornitología, Facultad de Biología Planta 9, 28040 Madrid, Spain. The PSG has an exchange-journal relationship with GIAM.

SEABIRD FOOD AND FEEDING ECOLOGY

The Seabird Group held its third international conference in Cambridge, England, from 12 to 14 February, 1988. More than 100 researchers participated including many from Europe. The meeting included fifty oral and poster presentations, dealing with *Seabird food and feeding ecology*, and a workshop organized by Andy Webb on seabirds at sea.



CONSERVATION NEWS

Antarctic Oil Spill

In late January, the Argentine supply vessel/tourist ship *Bahia Paraiso* struck submerged rocks near the U. S. Palmer Station in Arthur Harbor and the large Adelie Penguin rookery at Torgersen Island. Arthur Harbor also is home to many Wilson's Storm-Petrels, Southern Giant Petrels, Antarctic and South Polar Skuas, Blue-eyed Shags, and Kelp Gulls. All crew and tourists were evacuated safely. The ship shifted position and came to rest, leaking up to 250,000 gallons of diesel fuel and other contaminants.

This was Antarctica's worst oil spill. The rocky intertidal zone was hit severely. Locally nesting skuas abandoned, cannibalized, or killed their chicks, and seals show aberrant behavior. The spill occurred just as the Torgersen Island's Adelie Penguin chicks were getting ready to fledge. However, since the fledging birds and, later, their parents, would be going to sea -- with the prevailing, offshore winds and currents -- only a few dead penguins were seen, and no conclusions can be drawn. All of the penguins potentially had to swim through the slick to get to sea.

The U. S. National Science Foundation (NSF) airlifted tons of cleanup equipment to Punta Arenas, Chile, from which it was taken to Arthur Harbor. Argentine and Chilean crews joined the cleanup effort. A team of NSF scientists is now gathering base-line data and making a careful assessment of the slicks damage. A sad result of the spill is the extensive damage to the many biological studies being conducted at the Palmer Station.

An important aspect now is to follow these initial studies next (Antarctic) spring. A fair assessment of the immediate and long-term damage to the area requires a careful monitoring and censusing of the birds returning to Arthur Harbor.

Ron Naveen

Christmas Island, Indian Ocean

The Director of the Australian National Parks and Wildlife Service (ANPWS) has just announced his intention to add a major extension to the Christmas Island National Park. The complete park would cover about 63% of the island and would contain almost all the remaining nesting habitat of Abbott's Booby and Christmas Frigatebird.

Public comment has been called for until 16 June 1989. Some positive international feedback before that date would be very welcome as there may be significant opposition from mining interests. The Australian Government intends that there will be further mining but only in areas already cleared. Royalties from the mining will pay for rehabilitation of the mined areas. As you will see in a paper about to be published in *Biological Conservation*, wind turbulence generated by existing clearing has decreased breeding success and raised adult mortality of Abbott's Boobies for 300 m downwind (northwest) of clearings. The population appears to have declined from 2300 breeding pairs to 1900 pairs between 1967 and 1983. Some mining companies bidding for the tender to operate the mine are pushing the government to allow further clearing of rainforest.

This is our last, best chance to protect Christmas Island and deserves an extensive write-in campaign. If we win this one, it will be a major and lasting victory for all the Christmas Island wildlife.

Please help, by writing to Dr. J. D. Ovington, The Director of National Parks and Wildlife, GPO Box 636, Canberra ACT 2601, Australia. The deadline is 15 June 1989. If possible, please send a copy of your letter to Dr. Barry Reville, 7 Moroney Street, Spence ACT 2615 Australia or to D. Duffy, Institute of Ecology, University of Georgia, Athens, Georgia 30602, U.S.A.

Many Thank, ICBP Seabird Specialist Group.

Hurricane Gilbert Damages Yucatan

I recently attended (November 13) a one-day seminar on the Yucatan's conservation program, sponsored by *Pronatura*, World Wildlife Fund, and National Geographic Society. As part of the program, Dr. John Clark reported on the damage along the northern Yucatan coast inflicted by Hurricane Gilbert during the mid-September storm. Gilbert passed directly over Cancun and across the northern coast of the peninsula. Estimated losses include: 90% of mangroves, 60% of coral reefs, 60-90% of terrestrial vegetation damaged, major barrier island breaches, 15,000 hatchling sea turtles (in 3 turtle-rearing facilities), and 3-8,000 flamingos (16,000 survivors estimated). Sandy Sprunt made the bird estimate with Clark.

The figures are only estimates, of course, based on 4 hours of flight time and three jeep trips. About 600 photos were taken by Clark. for further information contact Dr. John Clark, Rosenthal School of Marine Sciences, University of Miami, 4600 Rickenbacker Causeway, Miami, Florida 33149.

R. Michael Erwin

Pronatura, A. C. - A Mexican Association ProConservation of Nature

Pronatura founded in 1981, was the first non-governmental, civic, non-profit conservation organization in Mexico, open to public participation through membership, dedicated to conservation of biological diversity through the protection of important habitat and endangered species of plants and animals.

In order to assure the conservation of biological diversity in Mexico, *Pronatura* has sought to develop working models for the conservation of natural habitat and the protection of endangered species. The lack of viable models in Mexico was one of the pitfalls that conservation, up until the creation of *Pronatura*, had encountered.

Perhaps of most importance, *Pronatura* has created a working model for grassroots cooperation on a bi-national level with the establishment in Tucson, Arizona, of a sister association called *Friends of Pronatura* that now has over 150 members from the United States interested in conservation programs both on the border and in the rest of the Mexican territory. Working outside of established parameters, *Friends of Pronatura* has enabled interested persons in both countries to share the responsibility and interest in conservation of regional and migratory species, and opened possibilities

for the establishment of bi-national reserves that span the Mexican-American border. For more information on *Pronatura* and *Friends of Pronatura*, please contact *Friends of Pronatura*, 240 East Limberlost, Tucson, Arizona 85705.

Problems for Shetland's seabirds

During the last few years, seabirds breeding on the Shetland Islands have had poor breeding success due to low food supply. The principal species affected include terns, kittiwakes, puffins and skuas, with evidence of reduced breeding success among Fulmars, Red-throated Loons, and Razorbills. In contrast, Murres, Shags, Cormorants, and Gannets have done well. A lack of availability of sandeels to seabirds is clearly behind the current problems, but reasons for the decline in sandeels is unclear. The sandeel fishery which began in 1974 rose to a peak landing of 52,600 tonnes in 1982, and has since declined to 4,800 tonnes by 1988. However, there is no evidence that the fishery is responsible for the decline. In the opinion of the Department of Agriculture and Fisheries of Scotland, overfishing of sandeels had not caused the poor recruitment or the recent reduction in spawning stock. In 1987, the Shetland's Fishermen's Association self-imposed conservation measures, prohibiting the landing of catches containing more than 25% of juvenile sandeels. The Shetland Bird Club is calling for a five year moratorium on the commercial fishing of sandeels around the islands as a minimum conservation measure. Clearly, more research is needed. Glasgow and Aberdeen Universities, the Nature Conservancy Council, the Institute of Terrestrial Ecology and the Department of Agriculture and Fisheries of Scotland have collaborated on a research proposal.

modified from Martin Heubeck's contributions
to *The Seabird Group Newsletter*, Numbers 52 and 53.



THE WASHINGTON REPORT, DAPHNE GEMMILL

A presidential campaign in which both candidates vied for the title of *Mr. Environmentalist* and a summer of hyperdermic needles, sludge and vials of blood washed up on our shores compelled the 100th Congress to produce some of the most significant environmental actions of the Reagan era. Seabirds, shorebirds and waders will be the beneficiaries of congressional action and inaction.

The most significant environmental victory was the reauthorization the Endangered Species Act. Because the plight of our oceans commanded the public's attention, it is not surprising that six bills addressed marine or near-shore issues. These bills established new marine sanctuaries and Gray's Harbor National Wildlife Refuge, imposed a moratorium on offshore oil drilling, restricted TBT in antifoulant boat paints, banned ocean dumping of sludge and plastic pollution at sea, and established a tracking system for medical wastes. Congress also increased the budgets for various fish and wildlife efforts, postponed debate on the future of the Arctic National Wildlife Refuge, and instructed the Environmental Protection Agency to regulate plastic six-pack holders. Brief summaries of each of these actions follow.

ENDANGERED SPECIES ACT PASSES

The Endangered Species Act, regarded as the most progressive wildlife protection law in the world, first passed in 1973. When the Act came up for reauthorization in 1985, special interest groups that wanted to weaken protection for wolves, grizzly bears and sea turtles successfully prevented passage of the bill for four years. The program, held to 1985 funding during the reauthorization process, limped along.

October 11, 1988, was a bannerday for conservationists and wildlife for the President signed a strengthened law that will increase funding and proved more protection for endangered species. Important provisions of the new act are: authorization funding increased 17% over the next four years, fines raised from \$20,000 to \$50,000 for violations of the law, new protection added for endangered plants, monitoring of *candidate species* to ensure that they do not decline dangerously while they wait to be listed, and funding for states that enter into cooperative agreements to assist in preserving endangered or threatened species.

NATIONAL MARINE SANCTUARIES ENHANCED

Congress reauthorized the sanctuary program under the Marine Protection, Research and Sanctuaries Act for four years. Key provisions are increased funding for the program, designation of several new sanctuaries: Cordell Bank and Monterey Bay off California, Flower Garden Banks in the Gulf of Mexico, and the outer coast of Washington. The bill also requires the National Oceanic and Atmospheric Administration to review sites in the San Juan Islands and to study several other sites.

In 1972, Congress passed the Marine Protection, Research and Sanctuaries Act. The sanctuaries program is designated to protect unusual, beautiful, and historically and ecologically significant areas. Only seven sanctuaries have been designated since 1972. Five out of the seven are to protect

spectacular coral reefs. the Gulf of the Farallons near San Francisco and the Channel Islands off southern California are the most significant for seabirds. Only one small marine sanctuary has been designated in the last eight years -- in American Samoa.

GRAY'S HARBOR, WASHINGTON RECEIVES NATIONAL WILDLIFE REFUGE STATUS

On August 19, 1988, President Reagan signed a bill authorizing the establishment of a 1,800 acre National Wildlife Refuge in the Bowerman Basin portion of Gray's Harbor, Washington, to protect wetlands of critical importance to more than one million migratory shorebirds. In addition, the legislation provides for the building of a visitor's center.

OFFSHORE OIL DRILLING ON HOLD

Congress once again placed a moratorium on oil lease sales off Florida and northern California and in New England's George's Bank and Alaska's Bristol Bay until October 1989.

RESTRICTIONS ON TBT IN ANTIFOULANT BOAT PAINTS

The President signed a law to ban the use of tributyltin (TBT) in boats under 25 meters in length, except for aluminum hull vessels, and both restrict the release rates of soluble organotins from TBT used on larger vessels. TBT is a major hazard to shellfish.

OCEAN DUMPING: BAN ON SLUDGE AND TRACKING MEDICAL WASTES

Dumping of sewage sludge at sea will be banned after 1991. After that, stiff fines will be imposed on any community that has not developed other means of disposing of its treated wastes. Medical wastes from hospitals, labs, and clinics must be tracked from its disposal by the medical facility to its end in an incinerator or landfill.

SENATE RATIFIES GLOBAL BAN ON PLASTIC POLLUTION AT SEA

U.S. action triggers global protection for thousands of marine animals that die each year because of plastic pollution. The U.S. Senate by a 93-0 vote ratified Annex V of the MARPOL Convention, an international agreement barring ocean disposal of all plastics. Coast Guard has issued a notice proposed rulemaking to implement the pollution prevention requirements of Annex V. The notice appeared in the *Federal Register* on October 27, 1988, p 43622. Copies may be obtained by writing to the Commandant (G-LRA-2/21), U.S. Coast Guard Headquarters, Room 2112, 2100 Second Street, SW, Washington, D.C. 20593-0001 or calling (202) 267 - 0491 between 7:00 a.m. and 3:30 p.m. EST, Monday through Friday, except Federal holidays.

FY 89 BUDGET HIGHLIGHTS

The good news is that the Forest Service fish and wildlife program funding increased \$18 million to \$65 million; Bureau of Land Management funding increased \$1.5 million, primarily for fisheries and riparian management; and Fish and Wildlife Service funding increased for endangered species, fisheries, farm protection and wildlife refuges. In addition, land acquisition funding increased from \$49 million to \$63.8 million, including

\$10 million for the Lower Rio Grande Valley National Wildlife Refuge. The bad news is that conservationists had hoped that this was the year that funds would be appropriated to bolster state fish and wildlife programs for non-game species, but the House Merchant Marine and Fisheries thought otherwise.

ARCTIC NATIONAL WILDLIFE REFUGE SAVED FOR NOW

During the 100th Congress, numerous committee and subcommittee hearings were held on the volatile issue of opening up the Arctic National Wildlife Refuge (ANWR) to oil exploration and future drilling. The issue brought heated exchanges between those who favored oil exploration and those who would protect it as wilderness. At stake is the calving area of one of the world's largest caribou herds, important habitat for shorebirds (as many as two million are found along the coastal plain during June and July), waterfowl and many other species, and five major and complete and undisturbed arctic ecosystems.

The campaign to protect the ANWR from oil development scored a very important, although, temporary victory in July when legislation to open the refuge was shelved until the next session.

PASSAGE OF THE PLASTICS POLLUTION CONTROL ACT

By 1990, the Environmental Protection Agency must establish regulations ensuring that plastic six-pack holders are made of biodegradable materials. EPA also must study, control and reduce the pollution of aquatic environments from plastic materials.

After years of neglect, environmental issues are in the limelight, on the cover of *Time* and agendas of summit meetings. Will President Bush live up to his statement "I am an environmentalist"? In conservation circles in the nation's capital, there is guarded optimism. The issues before Congress and this nation are extremely complex and politically sensitive. It will take strong leadership by Congress and the President to find effective solutions. Only time will tell how the 101st Congress will grapple with environmental issues.



INTERNATIONAL COUNCIL FOR BIRD PRESERVATION

4 January, 1989

Dear Fellow Seabird Biologist:

My first year as chairman of the ICBP Seabird Specialist Group (SSG) has been both exciting and frustrating. I've written a large number of letters. The group has intervened in several matters, yet we can point to few accomplishments. However, I think that several projects have begun that may change this.

At the very simplest level, the SSG endorsed the Second Mediterranean Seabird Symposium on "Status and Conservation of Seabirds" to be held in Mallorca in March, 1989 by MEDMARVIS (Mediterranean Marine Bird Association), as an aid to their fund-raising.

We lobbied the Australian government for a senior biologist to replace the late Gavin Johnstone in studying Antarctic seabirds. The matter remains under consideration. A number of members of the group, especially John Cooper of South Africa, played important roles in mobilizing support against the Marion Island airstrip.

With L. Tickell of England and M. Hurtado of Ecuador, we are trying to provide protection for Isla La Plata, off continental Ecuador. It appears too late to save this, the only other colony of Waved Albatross beside the one on Española Island, Galapagos, but the island has other important seabird populations that merit the effort.

The Spanish-language Latin American Seabird Bulletin enters its fourth year with over 100 members. Its low energy, entropy-resistant production appears to have paid off compared with fancier Latin American bulletins that seem to suffer a 'boom-bust' environment. Malcolm Coulter and I hope to shift the bulletin to a more professional format this year and to produce English-language extracts in the bulletin of the Pacific Seabird Group.

With C. Luthin of the Pan American section of the ICBP, we are planning a poster to educate Latin Americans about the problems of egging. There are too many small colonies in the tropics to protect them all. Many large sites are too isolated or desolate to be staffed. Education, while not perfect, appears to offer the only defense. Suggestions on the continents or approach of the poster and offers of translating the poster into French and Portuguese would be welcomed, as would ways of evaluating the poster's success.

J. Burger (U.S.A.), M. Gochfeld (U.S.A.), D. Nettleship (Canada), and I met at the Colonial Waterbird/Pacific Seabird Group meetings in Washington in October, 1988, to discuss plans for the seabird workshop during the upcoming New Zealand ICBP meetings. The workshop has evolved into an overview of threats to seabirds and islands, followed by detailed case studies of specific islands with different problems. The meeting will discuss potential management plans and solutions for the problems of each site. I believe the resulting document will be an important tool for the management of islands. The document will also provide specific actions that can be taken by the SSG and the ICBP Secretariat after the meetings.

At the end of the workshop, we will have a meeting of the SSG. I would

like to solicit short (five minute) reports on problem species and areas, especially those not covered by the workshop. I hope to persuade one or more of the seabird groups to publish the short reports, so the information is more widely available. We will also hear about the volume that John Croxall is producing to complete and update the proceedings that resulted from our Cambridge meeting. We can use the meeting to set up working groups to implement the plans produced by the island workshop.

We could also have a brief discussion of the need for and the usefulness of SSG as a coordinating body for global seabird projects such as an international colony site-register, an annual one-day world-wide beached bird count to look at oiling levels, and solutions to the gill nest and egging problems. If such a need exists, I hope participants, especially representatives of the regional seabird groups, will come prepared to discuss implementing such programs.

I know that many seabird biologists, especially students, won't be able to attend the meetings in New Zealand. Some of these people are among the most active amongst us, with the latest data from the field. If you are unable to attend, but have issues that need raising, or are willing to participate in one of the working groups, please write and I'll be sure that your information reaches the meeting and that you are included in our activities.

As a group, our structure needs improvement. As chairman, I find myself carrying on a very interesting correspondence with a large number of people, but I am not sure that the conservation payoff is particularly high. One chairman simply can't carry on a meaningful correspondence with 170 group members and be conversant on such a wide range of conservation problems. In addition to the chair, we have an executive committee, regional representatives, taxonomic representatives, representatives from the various seabird groups, and a small committee working on the next meeting. Only the latter appears to be functional, although there are many individual exceptions amongst the other representatives. On the other hand, conservation activity in the regional seabird groups has been very strong, so the interest exists. Either SSG is redundant, or its scale of participation is wrong.

As I see the SSG, it has three functions: 1) gathering information on conservation problems to funnel to the ICBP Secretariat and to seabird biologists; 2) coordinating international and interregional seabird conservation activities; and 3) helping local conservation projects, especially in areas without seabird groups.

To better carry out the first function, I'd like to suggest that the conservation chairmen of the seabird groups serve as regional representatives of the SSG, corresponding with seabird biologists in their regions, and funneling information and requests for action through me to the Secretariat. We would also circulate an annual summary of such information and requests to the regional seabird groups. Where regional seabird groups don't exist, national or regional ornithological societies could appoint representatives. For the second function, we need small interested standing committees that can provide continuity and effort over years or even decades. For the third function, we need small groups that are there only to work themselves out of existence by performing a particular task. Such groups would be created

attend SSG/ICBP quadrennial meeting and present their final reports at the next. The island management plans arising from the next workshop would appear ideal for such groups.

The advantage of this structure is that it puts a premium on active participation and on tangible products. It also avoids duplication of the effort of regional seabird groups. I'd appreciate comments on such restructuring. If the response is generally favorable, then the New Zealand meeting would be the obvious place to set such a structure in place.

As of 15 January, I will be working for the International Association of Ecology, trying to set up self-help networks for ecologists in countries without extensive scientific infrastructures. I will be based at the Institute of Ecology, University of Georgia, Athens 30602, U.S.A. I would welcome correspondence on any or all the matters raised above.

Finally, I would like to thank all of you who answered letters or who participated in planning the New Zealand conference or in updating the Cambridge volume.

With all best wishes for 1989,
Sincerely,

David Cameron Duffy
Chairman, Seabird Specialist Group



NEW PUBLICATIONS

Nelson, B. 1986. *Living with Seabirds*. Edinburgh University Press. 253 pp. \$25.00.

From somewhere, I recall an incisive review of Mayr's (1982) *Growth of Biological Thought*, in which G.G. Simpson used the term "autobiography" to describe that work. Simpson's term seems appropriate in a somewhat different context to characterize Bryan Nelson's most recent book about seabirds and more generally the Edinburgh series on Island Biology of which *Living with Seabirds* is the second selection. "The series aims to give a precise account of scientific results within a biographical work..." *Living with Seabirds* truly fulfills this objective as Nelson takes the reader on a tour of seabird field work from the perspective of an ethologist and naturalist. The journey begins at the gannetry on Bass Rock, Scotland and weaves its way through the history and natural history of the island, the nuts and bolts of Nelson's doctoral research on the gannets behavioral biology and ecology, the other seabirds of the Bass, the Galapagos, the Guano Islands of Peru and of Christmas Island in the Indian Ocean. During the course of these adventures, a great concentration and single-mindedness of purpose is exhibited in the execution of a truly world-class comparative behavioral study of the Sulidae during which Nelson was very aptly aided by his wife, June. Throughout the book, there are interesting tales of personal pleasures, trials and tribulations. Interspersed with these are some interesting but overly verbose waltzes through speculative adaptive scenarios. In Nelson's own words (p. 234) "...such scenarios are not unscientific, they are a help to understanding complex behavior. I cannot accept that they are merely unjustifiable speculation - as some mediocre 'hard-nosed' biologists with an undue reverence for facts alone, however stodgy, would aver. I say 'mediocre' deliberately because no outstanding biologist ducks the challenge of interpreting what he or she finds." Surely moderation is the key to mental clarity; too much speculation clouds vision at any level of contribution.

In my readings of Bryan Nelson's important and truly magnanimous contributions, I am always struck with contradictory feelings. On the one hand, Nelson's truly astute powers of clear, accurate behavioral description are impressive. On the other, the long-winded speculative adaptive scenarios that often go well beyond the point of mental futility are frustrating. Such is the paradox of *Living with Seabirds*.

W. A. Montevercchi
Memorial University of Newfoundland

NEW TITLES

Freethy, R. 1987. Auks: an ornithologists' guide. Blandford, Poole. 208 pp. £14.95. ISBN 0713715979.

Furness, R. W. 1987. The Skuas. T. and A. D. Poyser, Staffordshire. 368 pp. £18.00. ISBN 0-85661-046-1.

Harrison, P. 1987. *Seabirds of the World: A photographic guide*. Christopher Helm, London. 317 pp. £15.95. ISBN 0-7470-1401-9.

Whitman, P. L. 1988. *Biology and Conservation of the Endangered Interior Least Tern: A Literature Review*. U. S. Fish and Wildlife Service, Biological Report 88 (3). 22 pp.

BIBLIOGRAPHIES

FRENCH SEABIRD BIBLIOGRAPHIES

The Groupement d'intérêt Scientifique Oiseaux Marins (the French Seabird Group) prepares a bibliography of French seabird literature for its members each year. Bibliographies for 1986 and 1987 are available from: Dr. Pierre Yesou, 101, rue du 8 Mai, F - 85340 Olonne-sur-Mer, France.

BULLETIN BOARD

Bamfield Marine Station course on marine birds

The Bamfield Marine Station will run a 6-week, university credit course on the BIOLOGY OF MARINE BIRDS, from June 12 to July 21, 1989. The instructor is Dr. Alan Burger, former Assistant Director of the marine station, with several guest lecturers. Bamfield, on the west coast of Vancouver Island, is surrounded by diverse marine and shoreline habitats, with a wide variety of breeding and migrant birds. The course includes field projects and at-sea instruction aboard the station's research vessel *M. V. Alta*. Scholarships and bursaries are available for most students. For further information contact the Director, Bamfield marine Station, Bamfield, British Columbia, V0R 1B0 Canada, or phone: (604) 728 - 3301.

Oceanic Birds of South America

A set of these classic books by Robert Cushman Murphy are available for \$175.00 (or best offer), plus shipping cost. If interested, contact William T. Everett, Department of Birds and Mammals, San Diego Natural History Museum, P.O. Box 1390, San Diego, California 92112. (619) 589 - 0480.

Second International Conference on Marine Debris

The Second International Conference on Marine Debris will be held in Honolulu, Hawaii, from April 2 to 7. The conference will include both paper sessions and working group meetings. Topics to be discussed will include: sources and amounts of debris, entanglement, ingestion, ghost fishing, economic impacts, technological solutions, law and policy, and education. The meeting is sponsored by the Marine Mammal Commission, National Oceanic and Atmospheric Administration, Pacific Rim Fishing Industry, U.S. Fish and Wildlife Service, and the University of Hawaii Sea Grant Program.